Montana DNRC Forested Trust Land
Habitat Conservation Plan (HCP)

Aquatic Conservation Strategies for Bull Trout, Westslope Cutthroat Trout, and Columbia Redband Trout

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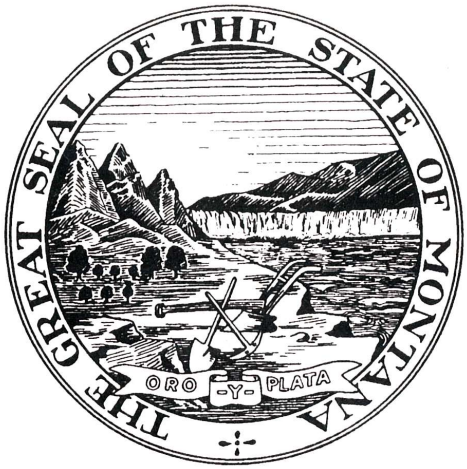

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Montana DNRC Forested Trust Lands HCP

Draft Conservation Strategy for Aquatic Species

The Montana Department of Natural Resources (DNRC) manages approximately 735,000 acres of forested school trust lands, mostly in western Montana. In pursuing long-term management goals, the DNRC is working with the US Fish and Wildlife Service (USFWS) to develop a habitat conservation plan (HCP) and application for an incidental take permit, as authorized by section 10(a)1(B) of the Endangered Species Act.

This document describes five of seven conservation strategies that will be the basis of Montana DNRC's HCP. Each conservation strategy is a set of conservation commitments designed to minimize and mitigate potential impacts of covered forest management activities. Each conservation strategy identifies biological goals for the species, DNRC objectives, proposed conservation commitments, and monitoring measures. The strategies were collaboratively developed by DNRC and USFWS for the purpose of identifying the proposed HCP commitments and documenting the biological and operational rationale. The aquatic strategies focus on bull trout, westslope cutthroat trout, and Columbia redband trout.

Interested parties are encouraged to review and comment on the conservation strategies. Written comments are due by November 20, 2005, 45 days after the release of the strategies. The project team also welcomes questions or comments by phone, e-mail, or at scheduled meetings. The purpose of the public review is to identify areas of concern with the conservation strategies or the planning process so the planning team can consider them prior to completing the Draft HCP/environmental impact statement (EIS). This public review period may also be used to identify issues, in addition to those identified during the formal scoping period, to further consider in the environmental analysis.

The conservation strategies do not represent the full draft HCP. There are other mandatory elements of an HCP that are still being developed, including anticipated levels of impact/take, changed and unforeseen circumstances, funding assurances, and alternative actions to taking. DNRC's current forest management program and existing species conservation measures are described in the species account documents that are available on the project website. DNRC and USFWS will be preparing a joint EIS, in combination with the HCP, that will provide detailed description and analysis of the anticipated effects of the HCP and other alternatives. There will be another public involvement and review process concurrent with the release of the draft HCP/EIS.

For additional information and conservation strategies for the other HCP covered species, please view our website http://www.dnrc.state.mt.us/hcp/, email us at dnrchcp@mt.gov , or contact:

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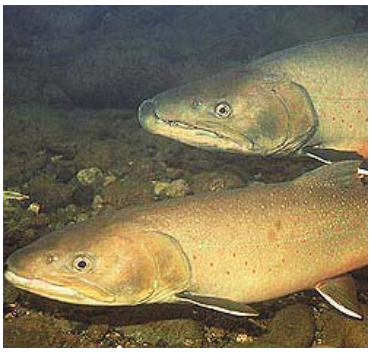
ACRONYMS

ACD	angular canopy density
ARM	Administrative Rules of Montana
ATWG	Aquatic Technical Working Group
AU	animal unit
AUM	animal unit month
BMP	best management practice
cm	centimeter
°C	Celsius
CLO	Central Land Office
CMP	corrugated metal pipe
CMZ	channel migration zone
CWA	Clean Water Act
dbh	diameter at breast height
DNRC	Department of Natural Resources and Conservation
ESA	Endangered Species Act
GIS	geographic information system
HCP	habitat conservation plan
HUC	hydrologic unit code
IDL	Idaho Department of Lands
LWD	large woody debris
m	meter
MBTRT	Montana Bull Trout Restoration Team
MCA	Montana Code Annotated
MBF	thousand board feet
MDEQ	Montana Department of Environmental Quality
MEPA	Montana Environmental Policy Act
MFWP	Montana Fish, Wildlife and Parks
MOU	memorandum of understanding
NCSPA	National Corrugated Steel Pipe Association
NRCS	Natural Resource Conservation Service
NWLO	Northwest Land Office
OHWM	ordinary high water mark
RCA	restoration/conservation area
RMZ	riparian management zone
SFLMP	State Forest Land Management Plan
SMZ	streamside management zone
SPTH	site potential tree height

SWLO	Southwest Land Office
TMDL	total maximum daily load
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WFPB	Washington Forest Practices Board
WMZ	wetland management zone



Section 1

Introduction for Aquatic Conservation Strategies

1. INTRODUCTION

The Forest Management Bureau of the Trust Land Management Division of the Montana Department of Natural Resources and Conservation (DNRC) is preparing a voluntary habitat conservation plan (HCP) for forest management activities on forested state trust lands. The HCP is part of the application for obtaining an incidental take permit from the U.S. Fish and Wildlife Service (USFWS). The HCP will address the effects to federally listed and unlisted species from DNRC's forest management activities on 548,530 acres of forested state trust lands within the HCP project area. This document pertains to the three HCP fish species: bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), and Columbia redband trout (*O. mykiss gairdneri*). Bull trout are federally listed as threatened under the Endangered Species Act (ESA), and westslope cutthroat trout and Columbia redband trout are listed as state sensitive species.

The HCP will include aquatic conservation strategies designed to avoid, minimize or mitigate potential impacts to the three HCP covered fish species as a result of forest management activities in the project area. Integral components of the aquatic conservation strategies of HCP development were the formulation of a biological goal, conservation strategies, and conservation commitments. The aquatic conservation strategies were developed primarily within the Aquatic Technical Working Group (ATWG) consisting of the USFWS and DNRC staff.

The ATWG began the process by identifying a specific biological goal that applied to the three HCP fish species. The identified biological goal was to protect bull trout, westslope cutthroat trout, and Columbia redband trout populations and their habitat and to contribute to restoration of habitat, as appropriate, that may have been affected by past DNRC forest management activities. The biological goal was used to formulate five objectives that served as targets for achieving the goal. These management objectives were based on best available science and support the basic habitat requirements of the HCP fish species by providing for cold, connected, complex, and clean water habitat. The five management objectives for HCP fish species are:

Objective #1: Manage for stream temperature regimes suitable for HCP fish species.

Objective #2: Manage for in-stream sedimentation levels suitable for HCP fish species.

Objective #3: Manage for levels of in-stream habitat complexity suitable for HCP fish species.

Objective #4: Maintain stream channel stability and channel form and function.

Objective #5: Provide for connectivity among sub-populations of bull trout, westslope cutthroat trout, and Columbia redband trout where appropriate on HCP lands.

The ATWG then formulated individual conservation strategies and commitments for the HCP fish species based on the biological goal and management objectives (Table 1-1). Due to the complex ecological interactions of aquatic ecosystems, the conservation strategies and commitments were categorized by impact type. The five aquatic habitat conservation strategies addressed connectivity, grazing, sediment, riparian conditions (including large woody debris [LWD]), and cumulative watershed effects. In combination, the five conservation strategies addressed all of the five management objectives (Table 1-1).

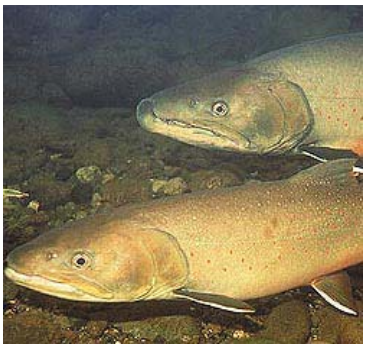
TABLE 1-1. CONSERVATION STRATEGIES THAT MEET MANAGEMENT OBJECTIVES

MANAGEMENT OBJECTIVE	CONSERVATION STRATEGY					
	RIPARIAN	SEDIMENT	CONNECTIVITY	GRAZING	CUMULATIVE WATERSHED EFFECTS	COMBINED STRATEGIES
Temperature	X	X		X	X	**X**
Sedimentation	X	X		X	X	**X**
Habitat Complexity	X	X		X	X	**X**
Channel stability, form, and function	X	X	X	X	X	**X**
Connectivity			X		X	**X**

Conservation commitments were defined within conservation strategies, and were supported by scientific data and rationale. The commitments were developed by the ATWG and were formulated in a collaborative effort to address both known scientific information and uncertainties in scientific knowledge, as well as existing data gaps. The commitments were designed to provide a conservation benefit for each of the three species, as well as ensuring that future timber harvest levels continue to offer a predictable and long-term flow of income to state trusts. In addition, other native coldwater fish species (which share similar habitat requirements) should benefit from the commitments, which may also aid in discouraging the establishment or spread of non-native fish. The ATWG recognizes that monitoring is a critical step in assessing the success of the conservation commitments in meeting the stated management objectives. A meaningful monitoring strategy, which addresses both the implementation and effectiveness of the various conservation strategies, also provides DNRC with the information required to effectively utilize adaptive management strategies. Therefore, the HCP includes numerous monitoring commitments in the form of five separate levels of monitoring that are built into the five conservations strategies.

1. Activity Reporting – DNRC will collect and report to USFWS on the status of numerous conservation strategy components (e.g., miles of high-risk roads and number of remaining barrier culverts will be provided in annual updates and the 5-Year Monitoring Report).
2. Qualitative Assessments – DNRC will evaluate HCP covered activities using qualitative methods (e.g., statewide/DNRC internal BMP audits, timber sale inspection reports).
3. Site-specific Quantitative Monitoring – DNRC will collect detailed quantitative information on biological elements at specific project sites (e.g., instream temperature and shade monitoring).
4. Long-term Cooperative Monitoring – DNRC will continue to participate in large, long-term site-specific and watershed-level cooperative monitoring efforts (e.g., the Swan and Stillwater State Forest fisheries monitoring and Flathead Basin Water Quality Monitoring).
5. HCP Implementation Monitoring –USFWS will conduct monitoring in order to evaluate the success of conservation commitment implementation.

In conclusion, the process of developing an HCP and obtaining an Incidental Take Permit through Section 10 of the ESA is a continuation of DNRC's high level of commitment to the conservation of Montana's native fish populations. DNRC will continue to collaborate with resource agencies and other stakeholders through participation in conservation agreements such as the Westslope Cutthroat Trout Conservation Agreement and Memorandum of Understanding and Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin, Montana.



Section 2
Riparian Harvest Conservation Strategy

2. RIPARIAN HARVEST CONSERVATION STRATEGY

2.1 CONSERVATION STRATEGY OVERVIEW AND RATIONALE

The Riparian Timber Harvest Conservation Strategy was designed to help ensure that important riparian functions are maintained at levels necessary to provide suitable habitat for HCP fish species. Important riparian functions specifically addressed in this strategy are LWD recruitment, stream shading, and stream bank stability. Sediment filtration is another important riparian function that is currently being addressed under a separate Sediment Delivery Reduction Conservation Strategy (see Section 3).

Under the proposed Riparian Harvest Conservation Strategy, DNRC will establish riparian management zones (RMZs) when timber harvests are conducted adjacent to streams and lakes potentially affecting HCP fish species. DNRC currently establishes streamside management zones (SMZs) and RMZs when timber harvests are proposed adjacent to streams supporting a fishery. Under the Forest Management Rules (Administrative Rules of Montana [ARM] 26.11.425), the combined width of an SMZ and RMZ on fish-bearing streams is equal to the site potential tree height (SPTH) at age 100 years. For the purposes of this conservation strategy, the combined SMZ and RMZ specified under ARM 26.11.425 shall be referred to as an RMZ.

Under the proposed conservation strategy, DNRC will utilize a tiered approach for designing and conducting riparian timber harvest. A stream or lake supporting an HCP fish species will be classified as a Tier 1 body of water. Timber harvests conducted within an RMZ established on a Tier 1 body of water will maintain a 25-foot no-harvest buffer zone located immediately adjacent to the affected body of water. Harvest within the remainder of a Tier 1 RMZ located outside of the no-harvest buffer will be limited to prescriptions that retain shrubs, sub-merchantable trees, and a minimum of 50 percent of the trees greater than or equal to 8 inches diameter at breast height (dbh). In addition, the prescriptions for a majority of timber harvests in the RMZ will retain a higher concentration of trees adjacent to the no-harvest buffer to reduce the potential for microclimate impacts. The Tier 1 conservation strategy also addresses the potential for stream channel migration by establishing a designated channel migration zone (CMZ). Under the proposed strategy, the RMZ will be extended in situations where the potential for channel migration within a CMZ might substantially influence riparian functions beyond the area represented by one SPTH.

Under the proposed conservation strategy, streams and lakes supporting non-HCP fish species, or those waters with no fisheries present, will be considered Tier 2 or 3, respectively. Timber harvest conducted within an RMZ established adjacent to a Tier 2 or 3 body of water will utilize the levels of conservation provided by current measures and practices implemented under Montana Forestry Best Management Practices (BMPs), ARMs, and the Montana SMZ Law and Rules.

The proposed conservation strategy also includes several exceptions addressing insect and disease infestations and fire salvage situations. In rare cases, RMZ harvest prescriptions may need to be modified when they are proposed in areas located on unstable slopes that are prone to mass wasting. This concern will be addressed in the sediment conservation strategy.

By designing riparian harvest practices within riparian areas located immediately adjacent to streams supporting HCP covered fish species (Tier 1 sites), the conservation strategy shall ensure that post-harvest riparian stand conditions are adequate to maintain those riparian functions most important to HCP fish species' habitat. The proposed conservation strategy is based on scientific research on widths of riparian buffers required to maintain adequate levels of buffer function, including LWD recruitment potential, retaining adequate levels of shade, and maintaining stream bank stability necessary to provide habitat suitable for supporting HCP fish species (Brown 1971; Martin et al. 1985; FEMAT 1993; Davies and Nelson 1994; Gomi et al. 2003; Sugden and Steiner 2003). These concepts are consistent with the DNRC HCP aquatic biological goal and objectives and provide a firm foundation to serve as the basis for a riparian harvest conservation strategy. The riparian harvest conservation strategy is expected to meet or

contribute to Montana DNRC HCP management objectives for temperature; sedimentation; habitat capacity; and channel form, function, and stability (Table 1-1).

To verify the proposed riparian strategy adequately provides the habitat conditions necessary for HCP fish species, DNRC will conduct monitoring activities on select Tier 1 streams to determine whether the proposed conservation strategy: (1) provides adequate levels of potential LWD recruitment to meet target in-stream LWD targets, (2) maintains adequate levels of in-stream shade in conjunction with timber harvest, and (3) maintains stream temperature regimes suitable to support the HCP fish species. Through monitoring, DNRC will verify that LWD targets (established with baseline or local reference reach LWD data) are met on 80 percent of the RMZ acres harvested. In addition, DNRC will monitor stream temperatures to ensure that riparian harvest prescriptions maintain suitable shade and stream temperature regimes (less than a 1°C increase from baseline conditions) in Tier 1 steams. The results of the monitoring efforts are expected to indicate that the aquatic conservation strategy is effective at maintaining the key riparian functions influencing fisheries habitat at a level that provides conservation of HCP fish species. However, if the monitoring results indicate any deficiencies or inadequacies, DNRC will collaborate with USFWS within an adaptive management framework to devise and implement alternative conservation commitments that will meet the management objectives and biological goals of the HCP.

2.2 EXISTING DNRC CONSERVATION STRATEGY

The Montana SMZ Law (Montana Code Annotated [MCA] 77-5-301 through 307) and Rules (ARMs 36.11.302 through 312) regulate commercial timber harvest conducted immediately adjacent to streams, lakes, and other bodies of water on all ownerships including DNRC. The law designates as Class I streams, (1) all streams supporting fish, and (2) streams contributing flow for 6 months of the year or more to another stream, lake or other body of water. Streams that do not support fish or do not contribute surface flow to another stream, lake or other body of water for 6 months of the year or more are considered either Class 2 or Class 3 streams. Class 2 streams are those stream segments that: (1) do contribute surface flow to another stream, lake or other body of water for less than 6 months of the year, or (2) have surface flow for 6 months of the year or more, but do not contribute surface flow to another stream, lake or other body of water. Class 3 streams are those stream segments that rarely contribute surface flow to other streams or other body of water, and normally do not have surface flow surface flow for 6 months of the year or more. Class 3 stream segments are typically not connected to other streams.

The minimum SMZ width on all stream classes is 50 feet. When slopes are greater than 35 percent, the SMZ width on both Class 1 or Class 2 streams and lakes is extended to 100 feet. The minimum SMZ width for Class 3 streams and other bodies of water is always 50 feet regardless of the SMZ slope. The SMZ width on all three stream classes and lakes must be extended to incorporate adjacent wetlands that intercept the normal SMZ boundary. Clearcutting within the SMZ (regardless of stream class) is prohibited. Harvest within a Class 1 SMZ must retain at least 50 percent of trees greater than or equal to 8 inches dbh, or 10 trees greater than or equal to 8 inches dbh for every 100 feet, on both sides of a stream, whichever is greater. Harvest within a Class 2 SMZ must retain at least 50 percent of trees greater than or equal to 8 inches dbh, or 5 trees greater than or equal to 8 inches dbh for every 100 feet, on both sides of a of stream, whichever is greater. Harvest within the SMZ of a Class 3 stream and other body of water must retain submerchantable trees and shrubs.

The trees retained in a Class 1 or Class 2 SMZ must be representative of the pre-harvest stand in species and size; bank edge trees, as well as trees leaning toward the stream, are to be favored for retention. Where a Class 1 or Class 2 SMZ has been extended to 100 feet, the retained trees are to be concentrated within the first 50 feet directly adjacent to the stream. When salvage logging in the SMZ, the minimum tree retention requirements are met by standing live trees, or by dead or fallen trees where sufficient standing live trees are not available.

The 100-foot extended SMZ width applies primarily to ground disturbance activities (ground-based equipment operation and road construction) and therefore can be considered largely a sediment filtration buffer. Extension of the 50-foot minimum SMZ to 100 feet does not substantially affect the level of riparian harvest and therefore does not necessary provide greater levels of conservation for the riparian functions of shade and LWD.

ARM 36.11.425 requires DNRC to establish an RMZ, in addition to the SMZ, when forest management activities (including timber harvest) are proposed on sites that are adjacent to fish-bearing streams. The total RMZ width is determined such that the total combined width of SMZ and RMZ is equal to the average potential tree height of the stand at age 100 years. Average tree height is determined using site index curves developed by the Intermountain Research Station of the U.S. Forest Service (USFS). The site index of a stand is determined by measuring tree height and age directly from suitable index trees located within the SMZ.

Harvest conducted within the combined SMZ and RMZ must retain all bank edge trees and retain enough other trees to ensure adequate levels of shade and potential LWD recruitment to the stream. Adequate levels of shade are defined under the ARM as those that maintain natural temperature ranges. Adequate levels of LWD recruitment are defined under the ARM as those that maintain channel form and function. Target levels of LWD and shade, and the adequacy of proposed prescriptions in meeting target levels, are currently determined on a site-specific project-level basis.

ARM 36.11.427(2)(i) and 36.11.427(3) also requires DNRC to design forest management activities to protect and maintain bull trout and westslope cutthroat trout and all other sensitive fish and aquatic species. The Forest Management Bureau maintains its own list of species that are considered sensitive under the rules.

Also under the ARMs, DNRC is required to minimize impacts to fish populations and habitat by making reasonable efforts, in its sole discretion, to cooperate in the implementation of conservation strategies developed by the State of Montana (Bull Trout Restoration Plan) and USFWS (Draft Recovery Plan) for restoration and recovery (pursuant to ARM 36.11.427). In addition, DNRC is a signatory to the Montana Westslope Cutthroat Trout Conservation Agreement and Memorandum of Understanding (MOU).

2.3 PROPOSED CONSERVATION STRATEGY FOR STREAMSIDE RIPARIAN TIMBER HARVEST

2.3.1 Riparian Functions

The proposed conservation strategy was developed to address the potential effects of DNRC riparian timber harvest on the three HCP fish species. The strategy was designed to ensure that key riparian functions are maintained at a level that provides conservation for HCP fish species. The conservation strategy focuses on those critical riparian functions that are most likely to be affected by timber harvest and at the same time are the most influential on the habitat of the HCP fish species. Riparian functions specifically addressed in this strategy are LWD recruitment, stream shading (used as a surrogate for stream temperature), and stream bank stability.

Sediment filtration is another critical riparian function that is currently being addressed in the development of the DNRC HCP under a separate conservation strategy. The Sediment Delivery Reduction Conservation Strategy (see Section 3) specifically addresses a set of proposed conservation strategy components designed to prevent potential sediment delivery associated with road construction, abandonment, maintenance, and use, as well as non-road timber harvest activities (such as felling, yarding, and landing of logs; site preparation; and slash disposal).

SPTH at age 100 years for a given site index was selected as the most practical and effective indicator that identifies the area where forest practices are most likely to affect riparian functions and biological

objectives addressed under this conservation strategy. The SPTH at age 100 years in most DNRC streamside riparian stands generally ranges from approximately 80 to 120 feet. The actual SPTH is largely dependent on the soil and climate of the landscape and other factors affecting the specific productivity of an individual site but is measurable at each site.

Streamside riparian timber harvest can reduce the supply of LWD available for potential recruitment to a stream. LWD is described as organic material that is recruited to the stream channel from the riparian zone and is generally of sufficient size to have a measurable effect on one or more stream hydraulic processes, such as sediment storage and pool formation. Examples of specific LWD definitions include: "piece must be at least 3 m [meters] in length or must have a length equal to or greater than two-thirds the wetted width of the stream and … must be at least 0.1 m in diameter one-third of the way up from the base" (Overton et al. 1997) and "any large piece of woody material that intrudes into a stream channel, whose smallest diameter is greater than 10 cm [centimeters], and whose length is greater than 1 m" (Meehan 1991).

LWD contributes to habitat complexity by adding wood cover to streams and influencing channel form and function by facilitating the creation and maintenance of hydrologic features (such as pools, gravel bars, and backwater areas). A reduction in LWD input to a stream may affect fisheries habitat by causing or contributing to channel instability, reducing in-stream habitat complexity, and influencing channel form and function. LWD also provides nutrients to streams, as well as substrate for aquatic invertebrate production.

The potential recruitment of LWD to stream channels from adjacent forest stands is generally limited to an area located within a width equal to or less than one SPTH as measured from the edge of the stream channel. This conclusion is well documented in the literature and is commonly used to delineate the width of SMZs or RMZs. In a study of streams in southeast Alaska, Murphy and Koski (1989) found that almost all (99 percent) of identified sources of woody debris in streams were within 100 feet of the stream bank. Nearly half of the woody debris came from trees located on the lower bank (less than 1 m away) and 95 percent was from trees within 66 feet of the stream. McGreer (1994) reported that a study completed by Andrus and Froehlich in the Oregon Coast Range in 1992 found that 70 percent to 90 percent of all LWD recruitment occurs within 100 feet of streams. McDade et al. (1990) reported that 85 percent to 90 percent of LWD recruitment comes from within 100 feet of stream channels in western Oregon. Robinson and Beschta (1990) studied the probability of tree LWD recruitment to streams. They concluded that the probability of recruitment was primarily a function of tree distance from the stream and effective tree height. Effective tree height was defined as that part of the tree height that would provide woody debris of a minimum diameter to a stream.

Harvest of trees near a stream may also reduce the amount of canopy cover and subsequent shade provided to a stream by that canopy. The principle source of heat for small mountain streams is direct solar radiation striking the surface of the water. Therefore streamside canopy cover and shading have a primary influence on stream water temperatures.

The effectiveness of various widths of riparian forest in providing shade to streams is also closely tied to SPTH. Studies have shown that approximately 80 percent of shade effectiveness occurs within 0.5 SPTH, and 90 percent effectiveness occurs within 0.7 SPTH (Oregon Forest Council 1999). A review of the available literature by Castelle and Johnson (2000) concluded that maximum shade produced in forest stands located adjacent to a stream was achieved within 17 to 30 m of the stream channel. Steinblums et al. (1984) evaluated the effectiveness of 40 different streamside buffer widths in western Oregon. These authors defined buffer strip effectiveness in terms of stream shading by quantifying angular canopy density (ACD) (a measure of the density of canopy actually capable of shading the stream) and concluded that 90 percent of maximum ACD could be obtained within a 17-m buffer. The values reported in the literature are all well within the range of SPTH occurring adjacent to streams supporting HCP fish species on DNRC forested trust lands.

Rates of LWD recruitment and stream shading to a stream channel are also a function of riparian stand type, riparian stand structure, channel incision angles, side slope gradients, channel processes, disturbance regimes, and climatic or elevation factors associated with different physiographic regions. Therefore, the expected amounts of functional LWD and shading found within stream networks throughout western Montana are considerably variable.

Riparian function and diversity in western Montana is dependent upon several different disturbance regimes, including wind, disease, landslides, and especially periodic, variable-intensity fire. As western Montana has undergone extensive fire suppression during the last century, existing ranges of LWD recruitment and stream shading found throughout forested state trust lands are thought to be higher than those that would otherwise occur naturally.

The root systems of trees located near stream banks provide channel stability. Harvest and removal of trees near stream banks may increase the potential for bank erosion and decrease channel stability.

Along with the critical riparian functions described above, several other secondary functions are considered as potential components for achieving the overall conservation objectives of adequate stream temperature regimes, in-stream habitat complexity, channel stability, and channel form and function. These secondary functions include nutrient loading, chemical filtering, and microclimate. While secondary riparian functions are not specifically addressed in the overall conservation strategy objectives, they are provided indirectly through the commitments contained in the riparian conservation strategy.

Nutrient loading to aquatic systems is an important role of riparian areas. Fish-bearing and non-fish-bearing streams are interconnected systems that have evolved to incorporate a range of site-specific nutrient inputs for primary production and macroinvertebrate food sources. This nutrient pathway is primarily through inputs of organic material in the form of LWD and litter fall. Rates of nutrient loading have been known to exceed or fall short of site-specific ranges following extensive riparian management, such as clearcutting. As the bulk of organic nutrients are input from an area within approximately one-half the SPTH, the proposed Riparian Harvest Conservation Strategy should provide an adequate mechanism for the range of nutrient loading rates that would be expected to occur in the different regions of forested western Montana.

Chemical filtering to aquatic systems is another important role of riparian areas. Chemical filtering involves the removal or dissipation of various natural and manmade pollutants. Fish-bearing and non-fish-bearing streams are interconnected systems that depend on this process for clean water. Chemical filtering occurs primarily through a riparian zone's ability to filter subsurface soil moisture and overland flows. The capacity of a riparian zone to conduct this process has been known to be suppressed following extensive riparian management or disturbance. As most chemical filtering by a riparian zone occurs within approximately one to one-half the SPTH, the proposed Riparian Harvest Conservation Strategy will help to provide the approach for the range of chemical filtering rates that would be expected to occur in the different regions of forested western Montana (Castle and Johnson 2000).

Microclimate is representative of the combined characteristics of site-specific humidity, wind speed, air temperature, and soil moisture and temperature regimes. A few studies suggest that upland harvest can modify the microclimate within riparian zones, but these studies primarily evaluate microclimate variables within the relatively dense stand conditions of old-growth, western Cascade Douglas-fir and western hemlock forests in Washington and Oregon (Chen 1991, Brosofske et al. 1997). Old-growth western Cascade Douglas-fir and western hemlock forests typically exhibit canopy closures of 70-80 percent (Chen 1991; Brosofske et al. 1997) and dominant tree heights of 105-250 feet (Uchytil 1991; Brosofske et al. 1997). Basal area, which is an indicator of productivity and tree density, is known to range from 362 to 444 square feet per acre in old-growth Douglas-fir forests of the western Cascades (Franklin et al 1981). The extent of vegetation growth in these old-growth forest conditions, described by canopy closure, tree heights, and basal area, tends to regulate to some degree the different characteristics of microclimate. Chen (1991) and Brosofske et al (1997) detected changes in the different characteristics

of microclimate through measurements within old-growth western Cascade Douglas-fir and western hemlock forests after adjacent clear-cut timber harvest. These studies consequently suggest that changes to microclimate within the riparian area as a result of adjacent timber harvest can adversely affect the aquatic ecosystem of streams.

Alternatively, the level of regulation of microclimate by riparian forests in western Montana is likely quite different than that found in the studies mentioned above, as riparian forests in the DNRC HCP project area are exceedingly different and variable than old-growth western Cascade Douglas-fir and western hemlock forests. Two of the fundamental differences between the areas are (1) that forest development of western Montana is driven by disturbance such as fire, which creates a mosaic of stand types of highly variable age and basal area, and (2) general productivity, which is heavily driven by annual precipitation, is much lower in western Montana. Riparian stand types within the HCP project area range widely from poorly-stocked sapling stands to well-stocked mature forests, and these stands also range from dry Ponderosa pine forests to high-precipitation western red cedar forests (DNRC 2004a). For instance, only 1.3 percent of all riparian areas adjacent to perennial streams in the project area include well-stocked, mature Douglas-fir stand types, which most closely resembles those stand types studied in Chen (1991) and Brosofske et al (1997). The dominant trees of well-stocked, mature Douglas-fir stands in the HCP project area typically never exceed 110 feet in height (DNRC 2004b) and the average basal area within the same stands is 165 square feet per acre (DNRC 2004a). Furthermore, in respect to all riparian stand types in the project area, DNRC technical surveys (1999-2005) indicate that canopy closures generally range from 0 to 60 percent. Since the extent of vegetation growth in the project area varies so greatly from old-growth western Cascade Douglas-fir and western hemlock forests, it is therefore logical to presume that there is a similar level of variability in microclimate characteristics in western Montana. As the levels of average existing vegetation growth within the riparian zones of the project area likely do not have a strong regulatory effect on microclimate characteristics, the selective harvest regimes used by DNRC are not expected to have a detectable adverse effect to microclimate and aquatic ecosystems.

Soil moisture and temperature is an important characteristic of microclimate, which in some instances may affect adjacent stream temperatures. Direct solar radiation on riparian soils as a result of selective harvest within a riparian area can hypothetically increase soil moisture within one SPTH, which could lead to increased stream temperatures during flow interception with the hyporrheic water table. However, the proposed conservation strategy will result in the retention of all trees and shrubs within 25 feet of a stream, and nearly all shrubs, sub-merchantable trees, and at least 50 percent of the trees greater than or equal to 8 inches dbh from within the remaining riparian management zone. Therefore, it is expected that on average, more than 80 percent of all trees, shrubs, and other ground cover will be retained within the riparian management zone following this proposed prescription. Thus, stream temperature is not expected to increase due to indirect effects of microclimate under the selective harvest regimes used by DNRC.

2.3.2 Tiered Approach

DNRC has developed a tiered approach for addressing potential impacts of timber harvest on riparian functions. This approach provides varying levels of riparian habitat protection depending on the potential to influence HCP species' habitat. Levels of protection are based upon the likelihood of HCP fish species' habitat being directly or indirectly affected by proposed streamside harvest activities.

- Tier 1 provides the highest level of conservation for HCP fish species' habitat. Tier 1 RMZ protection will be applied when timber harvests are proposed immediately adjacent to SMZ Law Class 1 streams and lakes supporting HCP fish species.
- Tier 2 protection will be applied to timber harvest conducted within RMZs established on SMZ Law Class 1 streams and lakes supporting non-HCP fish species.
- Tier 3 protection will be applied to timber harvest conducted within RMZs established on non-fish-bearing SMZ Law Class 2 and Class 3 streams, lakes, and other bodies of water.

2.3.2.1 Tier 1 RMZ – Conservation Strategy

Tier 1 applies to timber harvests proposed within an RMZ established immediately adjacent to streams and lakes supporting HCP fish species. Streams and lakes supporting an HCP fish species include all stream segments and lakes with bull trout, westslope cutthroat trout, or Columbia redband trout present. A lake (as defined in ARM 36.11.312) is a body of water where the surface water is retained by either natural or artificial means, where the natural flow of water is substantially impeded, and which supports fish. In certain cases the RMZ will be extended to include a CMZ.

a. The primary basis for determining HCP fish species presence will be fish population surveys completed by Montana Fish, Wildlife and Parks (MFWP), USFWS, or other land management agencies and entities. Currently, MFWP maintains this information on an Internet accessed database and associated geographic information system (GIS). DNRC will use this information, personal communication with local fisheries biologists (e.g., biologists from USFWS, MFWP, Plum Creek, and Tribes), and other information systems that may become readily available in the future to determine known presence of HCP fish species. This information is generally obtained by DNRC on a site-specific basis during individual project-level scoping, design, and assessment.

b. Fisheries surveys have not yet been completed for many of the streams occurring on forested state trust lands. Whenever practical and when funding is available and/or survey objectives are consistent with DNRC monitoring objectives, DNRC will cooperate with MFWP to collect fish presence/absence data on these unsurveyed stream reaches. However, given time, personnel, and budget constraints, it is not reasonable to assume that surveys can be completed for all unsurveyed areas. Therefore, DNRC will apply Tier 1 levels of this conservation strategy whenever survey data is not available and it is reasonable to believe the presence of a HCP fish species is likely.

c. DNRC will consider several factors when determining whether a HCP fish species' presence is likely. The factors that will be considered in making these determinations will include but are not limited to flow regime, stream gradient, channel forms, and other habitat features. The likelihood of HCP fish species' presence will be determined on a site-specific and project-level basis by a DNRC fisheries biologist or water resource specialist.

d. DNRC will establish an RMZ with a minimum width equal to one SPTH (at stand age 100 years) when timber harvests are proposed immediately adjacent to Tier 1 steams and lakes. SPTH at 100 years will be determined at the project level by field sampling the age and height of several site trees within the stand and comparing those values to locally or regionally developed site index curves.

RATIONALE. The SPTH at age 100 years in most DNRC streamside riparian stands generally ranges from approximately 80 to 100 feet. The actual SPTH is largely dependent on the soil and climate of the landscape and other factors affecting the specific productivity of an individual site. For most tree species in Montana forests, a tree age of 100 years is generally when the majority of growth contributing to tree height has occurred. DNRC believes that the width of an RMZ as identified by SPTH is a practical and effective way to establish an area where forest practices are most likely to affect the riparian functions and biological objectives being addressed under this conservation strategy (see Section 2.3.1, Riparian Functions, for more information regarding the SPTH).

e. DNRC will maintain a 25-foot-wide no-harvest buffer within Tier 1 RMZs. This buffer shall start at the edge of the ordinary high water mark (OHWM) and extend across the RMZ to a slope distance of 25 feet when measured perpendicular to the stream.

f. Harvest prescriptions within the remainder of the RMZ (from 25 feet to a distance equal to one SPTH) will retain shrubs, sub-merchantable trees, and a minimum of 50 percent of the trees greater than or equal to 8 inches dbh.

RATIONALE. Beyond the 50 foot minimum SMZ width, DNRC needs to maintain the flexibility to manage the remainder of RMZ (out to one SPTH) in order to promote specific tree species and age classes to meet desired future conditions. The retention tree commitments were designed to provide both short-term and long-term riparian functions.

g. Exceptions to implementation of the 25-foot no-harvest and 50 percent retention portions of the RMZ may occur in certain cases where harvest is necessary to address specific situations or circumstances that would include fire, insect, and disease salvage and a limited ability to emulate natural disturbance through non-salvage-related harvest.

i. In forest stands within an RMZ that are being impacted by disease or insect infestations (e.g., mistletoe, mountain pine beetle or Douglas-fir beetle), harvest of diseased or insect-infested trees may occur within the 25-foot no-harvest buffer. However, harvest of diseased or insect-infested trees from within the first 25 feet of RMZ will retain a minimum of 10 trees greater than or equal to 8 inches dbh (or largest diameter available) per 100 feet of stream channel. Retained trees will include all stream bank trees and downed trees lying within the stream channel or embedded in the stream bank. To help control disease or insect infestations, harvest of diseased or insect-infested trees from within the remaining RMZ may exceed those levels necessary to meet the normal 50 percent retention requirement. The minimum requirements of the SMZ Law must still be met.

ii. In areas within an RMZ that have been subjected to severe or stand-replacement wildfires, salvage harvest of dead trees may exceed the normal 50 percent retention requirement in that portion of the RMZ outside of the 25-foot no-harvest buffer. No salvage harvest of fire-killed trees will occur within the 25-foot no-harvest buffer. Downed trees that are lying within the stream channel or embedded in the stream bank will not be removed.

iii. Fire salvage proposed in a Tier 1 RMZ on projects involving more than 1,000 acres of burned DNRC forested trust land may invoke a changed circumstance HCP condition. A process for changed circumstances will be addressed in a separate section of the HCP.

iv. DNRC will manage a portion of the total Tier 1 RMZ acreage on state trust land using harvest prescriptions designed to meet the minimum retention tree requirements of the ARMs adopted under the Montana SMZ Law. These requirements include retention of at least 50 percent of the trees greater than or equal to 8 inches dbh on each side of the stream, or 10 trees per 100-foot segment of stream (86 trees/acre), whichever is greater. Tree retention will be based on the number of trees within the first 50 feet of the RMZ on both sides of a stream.

The RMZ stands targeted to be managed in this manner will be those stand types where shade-tolerant species exist and regeneration or maintenance of shade-intolerant tree species is necessary to achieve or maintain desired future stand types or provide long-term riparian functions. The amount of state trust land RMZ managed under this prescription will be limited to the extent that the total RMZ area treated in this manner when combined with the existing RMZ area in unstocked or seed/sapling size class within each DNRC administrative unit office does not exceed 15 percent.

DNRC will evaluate the level of RMZ area existing in non-stocked or younger size classes on state trust land for each administrative unit office on a 5-year basis. DNRC

will adjust the amount of RMZ area that could be treated in this manner to ensure that the target levels (15 percent) are not exceeded. If the target level is reached or exceeded on any individual administrative unit office, no additional non-salvage harvest using this specific exception will be conducted on that administrative unit land area until the amount of unstocked and/or seed/sapling size class acres drops below the 15 percent maximum allowable.

RATIONALE. This exception will allow DNRC to continue implementing the overall forest management philosophy committed to in the SFLMP and ARM of emulating natural disturbance regimes to maintain a healthy and biologically diverse forest. Wildfire is the predominant natural disturbance agent affecting the DNRC HCP project area. Riparian ecosystems and the associated riparian functions that contribute to cold-water fisheries habitat (large woody debris, shade and nutrient cycling) are to a certain extent provided and maintained by these disturbances regimes. Prior to the 1900's, riparian forests, like the adjacent upland forests, were subject to more frequent wildfire than has been observed over the last century largely due to fire suppression efforts (Barrett 1997,1998).

Riparian strategies that focus solely on unmanaged buffers or limit prescriptions to thinning are likely to alter the inherent disturbance regimes and patch dynamics of riparian ecosystems, and could adversely affect the long-term integrity of these ecosystems. Several studies, including Everett et al. (2001), have suggested the need to integrate disturbance events into riparian areas to maintain ecosystem functions by recognizing the dynamics of these systems. For example, seral riparian stands that include very large western larch trees (300+ years of age) that are perpetuated by frequent light burns are gradually disappearing from the landscape due to the competitive advantage fire suppression provides to shade tolerant species. Eventually these stand types, which commonly include 300+ year-old larch trees, will be eliminated from riparian zones as a result of fire exclusion (Agee 1994).

It has been estimated that in 1900 approximately 39 percent of the forested landscape in western Montana occurred in non-stocked and seedling/sapling age classes largely due to natural fire disturbance regimes (Losensky 1997). It is widely accepted that wildfires are more numerous in upland rather than riparian forest. DNRC recognizes that the generalized fire regimes summarized in this study might differ between riparian areas and uplands. In fact, several studies have looked at forested riparian types where frequency and severity of fires have been found to be lower than in adjacent uplands. For example, studies conducted on the east slope of the Cascades found that riparian forests had 25 to 42 percent less total fire disturbance events than upland forests (Everett 2001). However, other researchers have noted that, while a riparian zone may burn less frequently than uplands, this zone type occasionally burns more intensely than the surrounding slopes (Agee 1994).

In other regions and riparian types, fire regimes have been found to be comparable to uplands (Dwire 2003). A study conducted in the Upper Swan Valley concluded that mixed severity fires occurred with comparable frequency in both streamside riparian areas and uplands prior to 1920 (Barrett 1998).

Disturbance is an integral and natural component of riparian areas that contribute to important aquatic habitat functions and ecosystem integrity. Approaches to riparian protection that do not account for disturbance are unlikely to be successful. The 15 percent target level utilized in this strategy is based on a conservative estimate of the average amount of RMZ area that would be expected in younger size classes under the

naturally occurring range of disturbance regimes. This flexibility is needed to treat and manage stands where regeneration or maintenance of shade-intolerant tree species is necessary to achieve or maintain desired future stand types and maintain riparian function over the long-term.

v. An exception shall be made for the removal of individual hazard trees (those that pose a risk to public safety, roads, structures, and other improvements). A hazard tree is any tree that poses a risk to public safety, roads, structures, property and other improvements. Public safety refers to situations that pose a foreseeable risk of injury or death to a person.

h. DNRC will extend RMZs in situations where channel migration is likely to influence riparian functions that are potentially affected by a proposed timber harvest. DNRC has identified several types of CMZs where this potential is more likely. A CMZ is defined as the flood-prone width of a stream. Flood-prone width is defined as the channel width measured at an elevation twice the maximum bankfull depth.

i. CMZs usually influenced by forest management activities are limited to those that occur on streams with an entrenchment ratio of greater than 1.4 and with valley slopes of less than 8 percent gradient that exhibit unstable channel conditions or potential for relatively high rates of lateral channel erosion and lateral migration. CMZs will not be established when entrenchment ratios are less than 1.4, because such channels are highly confined and have little or no potential for channel migration. Two types of CMZs are recognized under this strategy, and they are classified using the following approach:

i. Type 1 CMZ. A Type 1 CMZ corresponds to the flood-prone area of streams exhibiting both valley bottom characteristics and alluvial processes. Valley bottom characteristics include channel slopes that are typically less than 1.5 percent and channel patterns that are meandering or braided. Alluvial processes mean that the stream is both eroding and depositing sediment throughout different parts of the channel. An example of an alluvial process would be a bend in the channel of a valley bottom stream, where the outside of the bend exhibits a deep channel that is eroding into the stream bank and the inside of the bend exhibits a shallow channel where eroded sediments are deposited. Streams with Type 1 CMZs typically migrate across valley bottoms rather slowly. Occasionally though, these streams are susceptible to very rapid migration to new or previously abandoned channels during major flood events. Type 1 CMZs are generally associated with Rosgen C, D, DA, and E channel types.

ii. Type 2 CMZ. A Type 2 CMZ corresponds to the flood-prone area of unstable streams exhibiting sudden erosion and deposition processes. Unstable streams are not able to efficiently transport sediment due to a variety of reasons, which can lead to increased rates of sediment deposition and channel migration. Unstable streams with Type 2 CMZs are uncommon, but where they occur, stream gradients typically range from 1 to 8 percent. Sudden erosion and deposition processes can occur on a Type 2 CMZ when a stream is forced out of its stream banks and into the flood-prone area. Examples of sudden erosion and deposition are (1) a moderately contained stream with evidence of recent sediment deposition on the forest floor outside of the stream channel, (2) alluvial fans, and (3) debris flows or torrents.

j. A CMZ will be established when harvest activities are proposed immediately adjacent to streams exhibiting these types of channel migration processes. The level of conservation applied within the CMZ will be determined by the type of CMZ present:

iii. On Type 1 CMZs, the portion of RMZ restricted to 50 percent retention will be extended when necessary to incorporate the entire flood-prone area. In the event that the width of the flood-prone area does not extend beyond the normal RMZ, the standard RMZ harvest restrictions will be applied. The 25-foot no-harvest buffer will not be extended.

RATIONALE. A Type 1 CMZ with a relatively stable stream channel or stream banks is more likely to withstand limited harvest without substantial risk of a loss of riparian functions because the typically gradual erosion rates would generally allow enough time for regeneration.

iv. A Type 1 CMZ established on a stream with an unstable stream channel or stream bank that exhibits evidence of recent lateral migration will receive the same level of protection as designated for a Type 2 CMZ (see Section j(iii)).

v. On Type 2 CMZs, no timber harvest will occur within the entire flood-prone width plus an additional 25-foot no-harvest buffer. The delineation of the normal RMZ width (based on SPTH), including the 25-foot no harvest buffer, will begin at the edge of the flood-prone width.

vi. Exceptions to the restrictions listed in Sections j(i) through j(iii) include those listed under Sections g(i) through g(iv).

2.3.2.2 Tier 2 RMZ – Conservation Strategy

a. Tier 2 levels of conservation apply to timber harvests proposed within an established RMZ that is immediately adjacent to a stream or lake supporting a non-HCP fish species. Streams and lakes supporting a non-HCP fish species include all stream segments and lakes known to have cold-water fish species present other than bull trout, westslope cutthroat trout, and Columbia redband trout.

b. The primary basis for determining HCP fish species presence will be fish population surveys completed by MFWP, USFWS, or other land management agencies and entities. Currently, MFWP maintains this information on an Internet accessed database and associated GIS. DNRC will use this information, personal communication with local fisheries biologists (e.g., biologists from USFWS, MFWP, Plum Creek, and Tribes), and other information systems that may become readily available in the future to determine known presence of HCP fish species. This information is generally obtained by DNRC on a site-specific basis during individual project-level scoping, design, and assessment.

c. Timber harvest conducted within a Tier 2 RMZ will utilize the existing levels of conservation provided by current practices and measures implemented under Montana Forestry BMPs, ARMs, and the Montana SMZ Law and Rules.

d. Tier 2 stream segments and lakes are classified as Class I streams under the Montana SMZ Law and Rules. Timber harvest conducted in a Tier 2 RMZ will comply with all applicable SMZ requirements for Class 1 streams regarding harvest prescriptions and tree retention including:

- Clearcutting will be prohibited in the SMZ.
- Timber harvests conducted in a Class I SMZ shall retain at least 50 percent of the trees greater than or equal to 8 inches dbh on each side of a stream or 10 trees per 100-foot segment, whichever is greater.
- Retention trees shall be representative of species and sizes in the pre-harvest stand.

- SMZs shall be extended to include adjacent wetlands, where the normal SMZ boundary intercepts a wetland. Retention tree requirements for the adjacent wetland are the same as the requirements for the normal SMZ.
- For SMZs extended for slopes greater than or equal to 35 percent, most of the retention trees shall be selected from within 50 feet of the stream. The remaining retention trees may be left anywhere in the SMZ.
- Submerchantable trees and shrubs shall be protected and retained.

e. Timber harvest conducted within a Tier 2 RMZ will also utilize practices implemented under the ARMs for fish-bearing streams. Under ARM 26.11.425, additional buffer width will be added to SMZ width when an SPTH exceeds the minimum requirement of the SMZ Rules. The combined width of an SMZ and RMZ on fish-bearing streams is equal to the SPTH at age 100 years.

2.3.2.3 Tier 3 RMZ – Conservation Strategy

f. The Tier 3 conservation strategy applies to timber harvests proposed within an SMZ or RMZ established immediately adjacent to a stream, lake, or other body of water that does not support a fishery.

g. Timber harvest conducted within a Tier 3 RMZ will utilize the current conservation measures and practices implemented under Montana Forestry BMPs and the Montana SMZ Law and Rules.

h. Tier 3 stream segments are classified as Class 2 and Class 3 streams under the Montana SMZ Law and Rules. Class 2 streams are those stream segments that (1) do contribute surface flow to another stream, lake or other body of water for less than 6 months of the year, or (2) have surface flow for 6 months of the year or more, but do not contribute surface flow to another stream, lake or other body of water. Class 3 streams are those stream segments that rarely contribute surface flow to other streams or other body of water, and normally do not have surface flow surface flow for 6 months of the year or more. Timber harvest conducted in Tier 3 RMZs will comply with all applicable requirements regarding harvest prescriptions and tree retention requirements including:

- Clearcutting will be prohibited in the SMZ of Class 2 streams.
- Timber harvests within Class 2 SMZs shall retain at least 50 percent of the trees greater than or equal to 8 inches dbh on each side of a stream or 5 trees per 100-foot segment, whichever is greater. Timber harvest conducted within both Class 2 and Class 3 SMZs will protect and retain submerchantable trees and shrubs.
- Retention trees within Class 2 SMZs shall be representative of species and sizes in pre-harvest stand.
- SMZs shall be extended to include adjacent wetlands, where the normal SMZ boundary intercepts a wetland. Retention tree requirements for the adjacent wetland are the same as the requirements for the normal SMZ.
- For Class 2 streams, the SMZ will be extended to 100 feet when SMZ slopes are greater than or equal to 35 percent. When the SMZ is extended, most retention will be selected within 50 feet of the stream. The remaining retention trees may be left anywhere in the SMZ.

2.4 PROPOSED MONITORING AND ADAPTIVE MANAGEMENT

DNRC will evaluate and monitor a representative number of sites where Tier 1 conservation strategies are implemented with the following monitoring objectives:

1. Determine whether no-harvest buffers and tree retention requirements provide adequate levels of potential LWD recruitment to meet target LWD levels.
2. Evaluate levels of in-stream cover provided by RMZ tree retention commitments.
3. Assess whether the levels of in-stream cover provided by tree retention commitments are adequate to maintain stream temperatures.

DNRC will coordinate with USFWS, MFWP, and other resource agencies on the monitoring objectives listed above and will discuss opportunities to incorporate additional monitoring objectives. At a minimum, DNRC will notify MFWP of upcoming monitoring activities.

A report summarizing the status of ongoing, recently completed, and planned monitoring activities will be prepared by DNRC after the initial 5-year monitoring period following implementation of the HCP. The 5-Year Monitoring Report will also include any preliminary monitoring results that are available at that time. Annual updates will consist of a summary of the status of all planned, ongoing, and recently completed monitoring projects.

A more comprehensive monitoring report containing an analysis of monitoring results with an assessment of the effectiveness of the proposed conservation strategy will be prepared by DNRC after an initial monitoring period of 10 years following the implementation of the HCP. This monitoring report will specifically address each of the three previously identified monitoring objectives.

2.4.1 Monitoring Objective #1

DNRC will determine whether the proposed conservation strategy provides adequate levels of potential LWD recruitment to meet in-stream LWD targets. This monitoring will be completed on five or more sites with riparian harvest adjacent to Tier 1 streams during the first 10 years following implementation of the HCP. Monitoring projects will include riparian harvest located on sites with slopes greater than 35 percent and on sites with slopes less than 35 percent. The distribution of monitoring sites between the two slope classes will be representative of the Tier 1 RMZs harvested. If five or more monitoring sites are not available due to a lack of riparian harvest, monitoring will occur on all available sites.

RATIONALE. For the first monitoring period (Years 1 through 5), it is unlikely that there will be a large pool of RMZ harvest sites to select for monitoring projects due to the time lag between HCP implementation and actual harvest activities. The level of monitoring reflected in this commitment is the extent that DNRC feels that it can accomplish given limited resources.

Each project monitored under this objective will include the following steps:

1. Establish site-specific LWD targets using on-site stream reach baseline LWD data or local reference reach LWD data. When on-site or local reference reach data is not available, DNRC will use regional LWD targets established from reference reach data compiled for different physiographic regions across the state. Regional targets will be stratified by stream channel morphological classification, such as Rosgen channel types.
2. Assess pre-harvest stand conditions within the project RMZ. Stand conditions will be characterized by tree diameters (at breast height) and tree density (trees per acre).
3. Evaluate post-harvest stand conditions within the RMZ.

4. Use model projections of forest stand growth, mortality, and LWD recruitment to evaluate whether both pre-harvest forest stand conditions and implemented harvest prescriptions meet LWD targets established for that specific stream reach.

If the monitoring results from ten or more monitored sites that are representative of DNRC operations and riparian stand types (estimated monitoring duration of 10 years) indicate that the conservation strategy is meeting this objective on 80 percent of the RMZ acres harvested, DNRC will discontinue this type of monitoring. If the RMZ harvest prescriptions implemented under the conservation strategy do not meet the 80 percent target, DNRC will develop and implement a modified approach to the design of Tier 1 RMZ timber harvests. Under this modified approach, stand conditions will be evaluated prior to RMZ harvests to ensure that the proposed prescriptions will retain an adequate number and size of trees to meet LWD targets. If, however, monitoring results are close to the target and/or the acres included in the analysis represented a small sample size, DNRC would continue to monitor implementation of this objective with the addition of another five monitoring sites.

The modified approach incorporates a pre-harvest LWD recruitment assessment procedure into the proposed conservation strategy. This modified approach will include the following steps:

1. Establish site-specific LWD targets using on-site stream reach baseline LWD data or local reference reach LWD data. When on-site or local reference reach data is not available, DNRC will use regional LWD targets established from reference reach data compiled for different physiographic regions across the state. Regional targets will be stratified by stream channel morphological classification.
2. Assess pre-harvest stand conditions within the project RMZ. Stand conditions will be characterized by tree diameters (at breast height) and tree density (trees per acre).
3. Use model projections of forest stand growth, mortality, and LWD recruitment to evaluate whether both pre-harvest forest stand conditions and implemented harvest prescriptions meet LWD targets established for that specific stream reach.
4. Ensure that harvest meets LWD targets on 80 percent of the RMZ acres harvested affecting Tier 1 streams.

2.4.2 Monitoring Objective #2

DNRC will conduct monitoring to ensure the effectiveness of the proposed RMZ harvest prescription in maintaining adequate levels of in-stream shade in conjunction with timber harvest occurring within the RMZs of select Tier 1 streams. In-stream shade is defined as the total solar energy affecting the surface of the stream in the stream reach adjacent to the timber harvest unit. This monitoring will be completed in conjunction with monitoring conducted under Monitoring Objective #1. Monitoring will occur on five or more sites with riparian harvest adjacent to Tier 1 streams during the first 5 years following implementation of the HCP. Monitoring projects will include riparian harvest located on sites with slopes greater than 35 percent and on sites with slopes less than 35 percent. The distribution of monitoring sites between the two slope classes will be representative of the Tier 1 RMZs harvested. If five or more monitoring sites are not available due to a lack of riparian harvest, monitoring will occur on all available sites.

This monitoring objective will be accomplished as follows:

1. DNRC will measure both pre- and post-harvest levels of in-stream shade by the best available, scientifically valid, commonly accepted method. Existing methods that meet these criteria include the Solar Pathfinder and angular canopy densitometer. DNRC will conduct shade monitoring activities on harvest units that meet the criterion described below.

2. DNRC will monitor in-stream shade on at least five sites in Tier 1 RMZs with timber harvest involving the removal of more than 25 percent of trees greater than or equal to 8 inches dbh as measured from the outer edge of the no-harvest buffer to the outer edge of the RMZ (based on SPTH). DNRC will prioritize selection of monitoring sites to study harvest units that have the greatest potential to produce measured effects on the level of in-stream shade (such as harvest areas with the highest levels of forest canopy removal or those harvest units with narrower RMZs).

3. DNRC will exclude RMZ harvest that results in the removal of less than 25 percent of trees greater than or equal to 8 inches dbh as measured from the from the outer edge of the no-harvest buffer to the outer edge of the RMZ (based on SPTH) from the shade monitoring, because this level of RMZ harvest has little to no chance of producing a measured reduction in stream shading.

Adaptive management for Monitoring Objective #2 is addressed in the discussion of adaptive management under Monitoring Objective #3.

2.4.3 Monitoring Objective #3

DNRC will conduct monitoring to determine if the levels of in-stream cover provided by the 25-foot no-harvest buffer and minimum tree retention requirements are effective at maintaining stream temperature regimes suitable to support the HCP fish species. DNRC will have a minimum of two ongoing stream temperature monitoring projects operating at any one time. Monitored sites will include riparian harvest located on sites with slopes greater than 35 percent and on sites with slopes less than 35 percent. All harvest units undergoing temperature monitoring will also undergo stream shade monitoring as described under Monitoring Objective #2. The distribution of monitoring sites between the two slope classes will be representative of the Tier 1 RMZs harvested. If the monitoring efforts show that DNRC is meeting these goals, it is anticipated that there will be no significant adverse effects on stream temperatures due to the standard harvest prescription included in the proposed conservation strategy.

1. DNRC will monitor pre- and post-harvest stream water temperatures on select representative riparian harvest areas to determine if stream temperature regimes are impacted by RMZ harvest. In-stream temperature will be measured with stream temperature data loggers (e.g., HOBO, Tidbit).

2. Temperature data loggers will be deployed along a gradient within, upstream of, and downstream of the reach potentially affected by timber harvest. The data loggers will be deployed during the summer months prior to timber harvest to collect maximum stream temperature data. The data loggers will also be deployed following completion of the RMZ timber harvest to collect maximum stream temperature data.

3. Temperature data will be analyzed to detect whether in-stream temperatures within or downstream of the harvested reach are 1°C or more higher than stream temperatures within non-harvested (control) reaches upstream of the harvested reach, after the temperature regime is adjusted with pre-harvest temperature data to account for natural longitudinal stream warming patterns and site-specific temperature variables (e.g., influence of tributary or large volume groundwater inputs). Specific temperature criteria to be used for this comparison are the highest rolling 7-day average of daily temperatures, as defined by (1) mean weekly average temperature, and (2) mean weekly maximum temperature.

4. For each temperature monitoring site, the data loggers shall be deployed for a period that includes a minimum of one summer high temperature period (July and August) for both pre- and post-harvest.

If monitoring results from at least five riparian harvest temperature monitoring sites are not available and more data is needed, then DNRC will continue this monitoring effort for an additional 5-year period. If monitoring results from the initial 10-year monitoring period indicate that riparian timber harvest implemented under this conservation strategy is maintaining suitable temperature regimes (stream temperatures do not increase more than 1°C), DNRC will discontinue the monitoring efforts and continue to implement the conservation strategy.

If monitoring data indicate that the conservation strategy is not effective at maintaining suitable temperature regimes in Tier 1 steams (water temperatures increase more than 1°C), adaptive management will be triggered. Should adaptive management be needed, the data collected from effectiveness monitoring activities will be reviewed to develop an alternate approach to addressing shade and stream temperature. If the quantity and quality of available data are adequate, the potential alternative approaches will include (1) developing a predictive relationship between in-stream temperatures and shade levels and then using this relationship as a screening-level tool on riparian timber harvest (which will allow comparison of pre-harvest and predicted post-harvest stream temperatures), and/or (2) establishing a minimum post-harvest shade level based on the monitoring data.

2.5 REFERENCES

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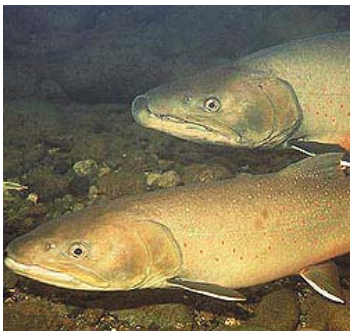

Section 3
Sediment Delivery Reduction Conservation Strategy

3. SEDIMENT DELIVERY REDUCTION CONSERVATION STRATEGY

3.1 CONSERVATION STRATEGY OVERVIEW AND RATIONALE

The Sediment Delivery Reduction Conservation Strategy was designed to reduce potential sediment delivery to streams with HCP fish species and to help ensure that DNRC forest management activities do not contribute to a level of in-stream sedimentation that would adversely affect HCP fish species. The sediment delivery reduction conservation strategy was designed to meet three specific management objectives for HCP fish species: (1) reducing the potential for in-stream sedimentation levels, (2) managing for levels of in-stream habitat complexity, and (3) maintaining stream channel stability and channel form and function (see Table 1-1).

The proposed conservation strategy for sediment delivery reduction evolved from an assessment of existing DNRC conservation strategies, identified gaps in the existing strategies, and new commitments that address the needs of HCP fish species. The proposed conservation strategy was designed to reduce the amount of potential sediment delivery to streams supporting HCP fish species resulting from DNRC forest management activities. The overall sediment conservation strategy consists of four separate but closely related components that address the potential for sediment delivery from different types of forest management activities. Under this strategy, DNRC will continue to use existing practices, measures, and programs to achieve the stated conservation objectives, and will supplement this effort with conservation commitments that clarify existing DNRC operational procedures. DNRC will commit to specific timelines for addressing existing sediment problems related to DNRC roads.

Based on the biological goal and specific management objectives of the sediment delivery reduction conservation strategy, DNRC will adhere to specific conservation commitments designed to:

1. Minimize the number of roads to those necessary to meet near and long-term forest management needs.
2. Reduce potential sediment delivery from existing road sources to streams supporting HCP fish species.
3. Construct, reconstruct, maintain, abandon, reclaim and use roads with practices and measures that reduce the risk of sediment delivery to streams supporting HCP fish species.
4. Conduct timber harvest and associated operations (site preparation, slash treatment, reforestation) with practices and measures that reduce the risk of sediment delivery to streams supporting HCP fish species.

These four components of the sediment delivery reduction strategy will reduce current and future sediment levels in streams and rivers supporting HCP fish species from DNRC forest management activities. They will provide clear commitments and assurances that the conservation strategy objectives will be met.

Specifically, DNRC commits to completing an inventory of its roads located in the HCP project area (with priority to those roads within watersheds supporting HCP fish species). Based on the completed road inventories, DNRC will classify all inventoried road segments/sites for their potential risk for sediment delivery to waterbodies, and use this classification to develop and implement site-specific corrective actions.

The commitment for reducing potential sediment delivery from DNRC timber harvest activities (harvest, yarding, site preparation, and slash treatment) will include enhancements designed to reduce the levels of soil disturbance and subsequent levels of erosion and providing buffers zones for effective filtration of sediment. This strategy includes the development of a process for ensuring adequate review by a DNRC water resource specialist of harvest activities that potentially affects HCP fish species. A DNRC water

resource specialist will make recommendations that would be integrated into the development contract specifications, site-specific BMPs, and other mitigation measures.

To verify that the proposed strategy adequately provides the sediment reduction necessary for HCP fish species, DNRC will conduct both implementation and effectiveness monitoring of the various conservation strategy components. Monitoring activities include quantitative assessments of the effectiveness of BMPs and other mitigation measures, BMP audits, and contract administration inspections. In addition, DNRC will track the amount of road that is constructed, reconstructed, relocated, abandoned, and reclaimed within the HCP project area and report these findings to USFWS. DNRC will update the USFWS on the status of monitoring projects and provide documentation of adequate designs and mitigations.

3.2 EXISTING DNRC CONSERVATION STRATEGY ARMS

Under the existing ARMs, DNRC is required to ensure that forest management activities conducted on forested state trust lands maintain high-quality water that meets or exceeds state water quality standards and protects designated beneficial uses. Beneficial uses include HCP fish species and their habitat.

It is generally recognized that one of the greatest potential effects of forest management activities on aquatic habitat is accelerated rate of erosion and subsequent sediment delivery to streams. The DNRC forest management program developed a comprehensive approach to (1) evaluate erosion and sediment delivery risk and (2) reduce the risk of erosion and sediment delivery. This approach incorporates various formal operational requirements that are contained in the Montana SMZ Law, the DNRC Forest Management Administrative Rules (ARM 36.11.421–427), and all applicable Montana Forestry BMPs. The following subsections outline the regulatory requirements, other policies, and operational practices used by DNRC for forest management activities to reduce the risk of erosion and sediment delivery to streams.

3.2.1 Existing DNRC Approach for Minimizing the Number of Roads for Forest Management

The current approach DNRC uses to minimize the number of roads necessary to conduct forest management activities is to limit roads to those that are necessary to meet near- and long-term forest management needs. This approach is best described in ARM 36.11.421, addressing road management and applicable Montana Forestry BMPs.

Where possible, DNRC uses existing roads, unless use of such roads would cause or aggravate an erosion problem or threaten water quality and associated beneficial uses. DNRC also considers closing or abandoning roads that are non-essential to near-term future management plans, or where unrestricted access would cause excessive resource damage. The term “near-term future” generally refers to a period of time between 15 to 20 years and is based on consideration of several factors, including planned activities, desired future conditions, silvicultural objectives, infrastructure needs, costs, and available human resources.

Comprehensive road management planning, including determining which roads to build, improve, maintain, close, abandon, or obliterate, is usually completed during project level analysis.

When planning the location, design, construction, and maintenance of all roads, DNRC complies with BMPs that are necessary to avoid unacceptable adverse impacts and, as funding is available, implements improvements to existing roads. Roads that are abandoned or reclaimed are left in a condition that provides adequate drainage and stabilization without requiring periodic maintenance.

Where possible and feasible, DNRC plans road systems cooperatively with adjacent landowners and considers yarding systems that minimize road needs. DNRC also attempts to minimize the number of stream crossings necessary for project objectives.

3.2.2 Existing DNRC Approach for Reducing Sediment Delivery from Existing Road Sources

The current approach DNRC uses to reduce sediment delivery from existing road sources is best described in ARM 36.11.421, addressing road management and all applicable Montana Forestry BMPs.

DNRC estimates that there are approximately 5,042 miles of existing road located on forested state trust lands. These lands are those parcels that contain a forest stand of at least 5 acres. Approximately 2,972 road miles are located on forested parcels in watersheds supporting HCP fish species. Roads have the potential to affect HCP fish species, particularly those segments of road that are located within 300 feet of a stream. It is estimated that approximately 1,258 miles (42 percent) of the existing roads on forested state trust lands are located within 300 feet of a stream.

DNRC is currently required to assess and prioritize road maintenance needs by inspecting the condition of both open and closed roads every 5 years (ARM 36.11.421(12)). Road inspections and other road inventory activities are the primary mechanism used to identify existing and potential sources of road erosion and sediment delivery to streams. DNRC uses several different approaches to conduct these road assessments on forested state trust lands.

Under the watershed monitoring program (ARM 36.11.424), DNRC has been conducting a systematic inventory of watershed conditions of forested state trust lands since 1998. These inventories are conducted statewide and are coordinated by the Forest Management Bureau. The inventories include comprehensive evaluations of existing road systems, stream crossing structures, and other potential sources of erosion and subsequent sediment delivery to streams. This information is used to characterize existing road conditions, determine maintenance needs, and prioritize necessary improvements. To date, watershed inventories have been completed for 127,116 acres of forested state trust land that include approximately 763 miles (15 percent) of existing road.

In addition to the road inventories conducted under the watershed monitoring program, the Northwest Land Office (NWLO) and Southwest Land Office (SWLO) also have ongoing road monitoring programs in place for inventories of existing roads on forested state trust lands. These inventories include information on stream crossings and relief drainage structures, problem areas, general maintenance needs, and assessments of the status of road closure structures. DNRC has appropriated approximately $20,000 annually to both the NWLO and SWLO for contract services to help complete these road inventories and assessments. To date, approximately 703 miles (14 percent) of existing road occurring on forested trust land have been evaluated under these programs.

Additional road inventories and assessments are completed during DNRC timber sale planning, design, and environmental assessment. Almost all DNRC timber sales include various aspects of transportation planning. Watershed assessment and analysis completed for timber sale projects typically include a similar level of comprehensive road evaluation, specifically for existing road conditions and maintenance needs within the project planning area.

During these assessments, road erosion sources and road segments at risk of sediment delivery are identified. It is estimated that an average of 114 miles of existing road are evaluated annually through timber sale project planning. Other road improvement needs are identified through casual observations or reports made by DNRC field staff during the normal course of carrying out their administrative duties.

DNRC typically implements actions aimed at reducing or eliminating identified or potential sources of sediment from existing roads at the project level. These actions usually consist of various road improvements, road maintenance activities, and road upgrades that have been identified within the project

area. These actions are generally intended to bring the existing roads up to a standard that complies with BMPs.

BMPs are incorporated into the project design and implementation of forest management activities. The proper application of appropriate BMPs has been repeatedly demonstrated to minimize sediment transport and delivery from roads (Burroughs 1989, Cook 1983, Ethridge 2004, Rothwell 1983 and Seyedbagheri 1996). BMPs applicable to a given project or situation are determined during project development and environmental analysis. DNRC complies with BMPs as necessary to avoid unacceptable adverse impacts or, as funding is available, to implement improvements to existing roads.

In some cases, a particular road or segment of road cannot be brought up to acceptable standards due to location, road conditions, or other factors. DNRC also avoids the use of existing roads in SMZs where potential water quality impacts cannot be adequately mitigated. In those cases, the road or portion of the road may be relocated, abandoned, or obliterated. DNRC generally determines which roads to close, abandon, or reclaim during project-level analysis.

Existing roads are often relocated if reconstruction, maintenance, and/or use of the road would produce greater undesirable impacts than new construction at a more appropriate location. Additionally, roads are considered for closure, abandonment, or reclamation when they are non-essential to near-term future management plans or where unrestricted access would cause excessive resource damage. Abandoned and reclaimed roads are left in a condition that provides adequate drainage and stabilization.

Road improvements, maintenance, and upgrades are typically implemented under timber sale contracts that are associated with a project. DNRC timber sale contracts that were active between 2001 and 2003 accounted for improvement of 121 miles of existing road and maintenance activities on approximately 172 miles of existing road.

During timber sale contract development, individual BMPs are designed, customized, or enhanced for site-specific locations to reduce or eliminate the risk of erosion and subsequent sediment delivery. If road construction, road improvements, or road maintenance is part of a timber sale; the timber sale contract will contain road construction, road improvement, and road maintenance specifications, specification drawings, and detailed road logs to ensure that road activities are completed as designed and meet resource protection requirements. This information is contained in Attachment B of the timber sale contract (also provided in Appendix A of this document). The Attachment B road specifications not only include road engineering and construction standards, but also contain specifications for the installation of drainage structures, sediment control fences, seeding and revegetation, surface reshaping, cleaning of drain ditches and culverts, snow plowing, and dust abatement. The drawings included in Attachment B may include specifications for road cross sections, clear limits, slash filter windrows, and other design features included in the project road plan. Contracts also include provisions to ensure that road maintenance is commensurate with the expected road use (see Appendix A).

DNRC administers all road improvement projects to ensure that activities are conducted as specified in contracts and that resource protection requirements are being met. Adjustments are made in cases where operations fail to meet requirements, unforeseen circumstances are encountered, or when operating conditions may require design modifications. Projects are typically monitored through weekly inspections. Results of contract inspections are documented through the completion of written contract inspection reports. Every 5 years, DNRC compiles the results of all contract inspection reports and includes a summary of the information in a monitoring report completed for the State Board of Land Commissioners.

DNRC road use agreements, including rights-of-way, consist of road maintenance requirements that are proportional to road use. These requirements are enforced during the administration of those agreements.

A portion of the forest improvement funds collected under each timber sale are set aside for road maintenance needs. These funds are allocated annually to each administrative land office for

implementation. The land office selects and prioritizes individual road maintenance projects to be implemented with these funds. On average, DNRC has used forest improvement funds to complete approximately 46 miles of road improvements on an annual basis.

3.2.3 Existing DNRC Approach for Reducing Potential Sediment Delivery from New Road Construction, Road Reconstruction, Maintenance, Abandonment, Reclamation, and Road Use

The current approach DNRC uses to minimize the amount of potential sediment delivery from new road construction, reconstruction, maintenance, abandonment, reclamation, and use is best described in the SMZ Law (MCA 77-5-301 through 307) and Rules (ARM 36.11.421) addressing road management, and applicable Montana Forestry BMPs. The measures and practices described in Section 3.2.2 – Existing DNRC Approach for Reducing Sediment Delivery from Existing Road Sources also apply to new road construction activities, reconstruction, abandonment, reclamation, and road use activities.

The SMZ Law and ARMs 36.11.302 through 312 regulate timber harvest, including road-related activities that are conducted immediately adjacent to streams, lakes, and other bodies of water. One of the primary objectives of the SMZ Law is to provide effective sediment filtration to maintain high water quality.

The SMZ Law designates all streams supporting fish or streams that contribute surface flow for at least 6 months of the year to a stream supporting fish as Class 1 streams. The minimum SMZ width on Class 1 streams is 50 feet. When slopes are greater than 35 percent, the minimum SMZ width is extended to 100 feet on Class 1 streams. Exceptions to this rule include established roads within 50 and 100 feet and benches (topographic features) where the slope of the SMZ decreases to 15 percent or less for at least 30 feet. The SMZ boundary is also extended to include wetlands located adjacent to Class 1 streams.

The SMZ Law prohibits the construction of roads in an SMZ except when necessary to cross a stream. The SMZ Law also prohibits road fill material from being deposited within an SMZ during road construction, except as necessary to construct a stream crossing. The SMZ Law does not determine when it is necessary to construct a stream crossing. However, DNRC-sponsored stream crossings of Class 1, 2, and 3 streams are subject to regulation under the Montana Stream Protection Act (MCA 87-5-501). The SMZ Law also prohibits the side-casting of road material during maintenance into a stream, lake, wetland, or other body of water.

Under the Montana Stream Protection Act, DNRC is required to apply for and obtain a 124 permit from MFWP before initiating any activities that may alter the bed or banks of any stream in the state. These permits are obtained for all installations and removals of stream crossing structures. A 124 permit may require specific designs, operating restrictions, or other mitigation measures. The 124 permit may also specify the requirement of DNRC to obtain a short-term exemption from Montana water quality standards. These permits are called 318 authorizations, and are obtained from the Montana Department of Environmental Quality. A 318 authorization may also require specific designs, operating restrictions, or other mitigation measures.

Montana Forestry BMPs contain a broad range of specific practices addressing road planning and location, road drainage, road construction, road maintenance, stream crossing design, and stream crossing installation. The proper application of appropriate BMPs has been repeatedly demonstrated to minimize sediment transport and delivery from roads (Burroughs 1989; Cook 1983; Ethridge 2004; Rothwell 1983; Seyedbagheri 1996). All road construction, reconstruction, maintenance, use, abandonment, and reclamation associated with DNRC forest management activities are designed to implement appropriate and applicable BMPs (ARM 36.11.421(3) and 36.11.422(2)). DNRC complies with BMPs as necessary to avoid unacceptable adverse impacts. BMPs appropriate for a given project or situation are generally determined during project development and environmental analysis.

DNRC roads are built to the minimum standard necessary to best meet current and future management needs and objectives and to minimize necessary maintenance. DNRC avoids use of existing roads in SMZs when potential water quality impacts cannot be adequately mitigated. DNRC considers relocation of an existing road when reconstruction, maintenance, and/or use of the existing roads would produce greater undesirable impacts than relocation.

A DNRC water resource specialist and/or soil scientist review most DNRC timber sales and timber permits that involve substantial levels of new road construction or reconstruction. General and site-specific BMP designs and other mitigations recommended by specialists are incorporated into timber sale environmental assessments and contracts.

DNRC timber sale contracts include detailed information, standards, and specifications for implementation of site-specific BMPs, mitigations, and other resource protection measures (see Appendix A which includes Attachment B of DNRC's Road Inventory Procedures). The timber sale contracts also contain road construction, road improvement, and road maintenance specifications, specification drawings, and detailed road logs. This information is contained in Attachment B of all timber sale contracts.

The road specifications contained in Attachment B of DNRC's Road Inventory Procedures (see Appendix A) not only include road engineering and construction standards, but also contain specifications for the installation of drainage structures and sediment control fences, seeding and revegetation, surface reshaping, cleaning of drain ditches and culverts, snow plowing, and dust abatement. The drawings included in DNRC's Road Inventory Procedures may include specifications for road cross sections, clear limits, slash filter windrows, and other design features included in the project road plan. The road logs include detailed instructions for site-specific road construction and BMP design.

DNRC administers road construction projects to ensure that roads are built as designed and meet resource protection requirements. Road maintenance is commensurate with expected road use. DNRC maintains drainage structures and other resource protection measures on both restricted and open roads.

3.2.4 Existing DNRC Approach for Reducing Potential Sediment Delivery from Timber Harvest and Related Activities (Site Preparation, Slash Treatment, and Reforestation)

The existing DNRC approach for reducing the risk of sediment delivery from timber harvest activities focuses on reducing the levels of soil disturbance and subsequent risk of erosion, and providing buffer zones for effective filtration of sediment. This approach is best described in the SMZ Law and Rules, ARM 36.11.422 through 426, and Montana Forestry BMPs applicable to timber harvest, site preparation, slash treatment, and reforestation.

The SMZ Law (MCA 77-5-301 through 307) and ARM 36.11.302 through 312 regulate timber harvest activities conducted immediately adjacent to streams, lakes, and other bodies of water. One of the primary objectives of the SMZ Law is to provide effective sediment filtration to maintain high water quality. Other riparian functions related to sediment addressed under the SMZ Law and Rules are protection of stream channel and banks and promotion of floodplain stability.

The SMZ Law designates all streams supporting fish or streams that contribute surface flow for at least 6 months of the year to a stream supporting fish as Class 1 streams. The minimum SMZ width on Class 1 streams is 50 feet. When slopes are greater than 35 percent, the minimum SMZ width is extended to 100 feet on Class 1 streams. The SMZ boundary is also extended to include wetlands located adjacent to Class 1 streams.

The operation of wheeled or tracked equipment (including ground-based harvest, yarding, site preparation, and slash treatment systems) is prohibited within the SMZ except on established roads. As an exception to the rule, equipment may be operated inside an SMZ on the side of an established road away

from the stream whenever the toe of the road fill is 25 feet or more from the OHWM. Skid trails are to be located approximately 200 feet apart and are to be reclaimed through the installation of erosion control features and reestablishment of vegetative cover.

Under another exception, equipment may also operate within an adjacent wetland when the ground is frozen or there is adequate snow, as long as the equipment does not come within 50 feet of the OHWM (or 100 feet when extended for slopes of greater than 35 percent) and as long as the operation does not cause rutting and displacement of the soil.

When logs are winched or cable yarded across a Class 1 stream by equipment located outside of the SMZ, the logs must be fully suspended unless otherwise authorized pursuant to the Natural Streambed and Land Preservation Act (MCA 75-7-101).

Broadcast burning is also prohibited in the SMZ without a site-specific alternative practice.

ARM 36.11.425 requires DNRC to establish an RMZ that is in addition to the SMZ when forest management activities are proposed on sites adjacent to streams that are determined to have high erosion risk. Sites with high erosion risk are those sites with highly erodible soils or subject to conditions that result in higher risk of erosion. On these sites, the combined width of the SMZ and the RMZ is a minimum of (a) 100 feet for slopes greater than 25 percent to less than 35 percent, (b) 150 feet for slopes greater than or equal to 35 percent to less than 50 percent, and (c) 200 feet for slopes greater than or equal to 50 percent.

Ground-based equipment operations within an RMZ established for sites with high erosion risk are not allowed on slopes greater than 35 percent and are restricted on slopes less than 35 percent to those operations and conditions that do not cause excessive compaction or displacement of the soil. Equipment operations are allowed in the RMZ above established roads pursuant to SMZ Rules. Cable yarding is restricted to systems and operations that do not cause excessive ground disturbance within the SMZ or RMZ.

Under the ARMs, DNRC establishes wetland management zones (WMZs) when forest management activities are proposed within or adjacent to wetlands located within an SMZ. The minimum WMZ boundary for wetlands located within an SMZ is 50 feet. Equipment operations within the WMZ are limited to low-impact harvest systems and operations that do not cause excessive compaction, displacement, or erosion of the soil. Ground-based harvest operations are also limited to periods of low soil moisture, frozen soil, or snow-covered ground conditions. Ground-based harvest operations are also required to minimize the number of skidding routes and passes through the WMZ. Cable yarding systems are restricted to full suspension or partial suspension during periods of low soil moisture, frozen soil, or snow-covered ground conditions.

DNRC timber harvest, yarding, landing, site preparation, and slash treatment operations are designed to implement all appropriate BMPs (ARM 36.11.421(3) and 36.11.422(2)). The proper application of appropriate BMPs has been repeatedly demonstrated to minimize sediment transport and delivery from timber harvest-related activities (Collins 2002; Collins 2003; Collins 2004; Ethridge 2004; NACASI 1994a; NACASI 1994b; NACASI 1979; Seyedbagheri 1996). DNRC complies with BMPs as necessary to avoid unacceptable adverse impacts. BMPs appropriate for a given project or situation are generally determined during project development and environmental analysis.

Montana Forestry BMPs address the selection of proper logging systems. When ground-based harvest and skidding systems are used, BMPs will address trail design, location, construction, drainage, and erosion control. Ground-based operations are to be avoided on unstable, wet, and easily compacted soils or slopes that exceed 40 percent. Similar BMPs address practices for ground-based site preparation and slash treatment operations.

All DNRC timber sales and permits that have the potential to cause substantial levels of soil disturbance or projects determined to have potential risk to soil and water resources are reviewed by DNRC water resource and/or soil resource specialists. The level of assessment varies with the size of the project, the sensitivity of the resource, and the types of issues or concerns associated with the project. General and site-specific BMP design and other mitigations recommended by specialists are incorporated into timber sale environmental assessments and contracts. General mitigations are developed during the environmental assessment. Site-specific mitigations and customized BMPs are developed during the design of the timber sale contract.

All DNRC timber sale contracts include Standard Resource Protection and General Logging Requirement Clauses. These contracts also contain standards and specifications for the implementation of site-specific BMPs, mitigations, and other resource protection measures (see Appendix A). Timber sale contracts commonly contain special operating requirements that can be used for unique or special situations requiring customized, enhanced BMPs or other necessary mitigation measures.

Proper implementation of contract specifications is monitored through field administration of contractors. DNRC conducts frequent field inspections of timber sales contract operations (usually weekly at a minimum). Areas in need of improvement or in direct violation of the contract are documented during these inspections and are immediately addressed. Inspection reports are prepared to document the implementation of contractual requirements.

Almost all DNRC timber sales undergo BMP audits that evaluate and document the implementation and effectiveness of BMPs used on the project. DNRC soil, water, and fisheries resource specialists from both the Forest Management Bureau and administrative land offices complete internal BMP audits. Internal BMP audits are conducted during any phase of timber sale operations on both active and recently completed timber harvests. Statewide audits are completed biannually by interdisciplinary teams consisting of representatives from various forest landowner groups throughout Montana. Four to five DNRC harvest sites are typically completed in each BMP audit cycle. BMP audits provide an important feedback mechanism to DNRC on the implementation and effectiveness of BMPs. Approximately 90 internal and 19 statewide BMP audits have been completed on DNRC timber sales since 1998.

Since the inception of the statewide BMP audits in 1990, DNRC has consistently ranked among the highest of all ownership groups in both BMP application and effectiveness (Ethridge 2004; Ethridge 2002; Ethridge et al 2000). The results of the DNRC internal BMP audits are comparable with the results of the statewide audits (DNRC 2000). The results of all BMP audits conducted on DNRC sites since 1998 through both of these processes are summarized in the Table 3-1.

TABLE 3-1. BMP AUDIT EFFECTIVENESS MONITORING

Audit Cycle	Percent (%) Practices Rated					
	BMP Application			BMP Effectiveness		
	Meet or Exceed	Minor Departures	Major Departures	Adequate Protection	Minor/Temp. Impacts	Major Impacts
Statewide 1998	96	4	0	99	1	0
Statewide 2000	97	2.7	<1	98	1.8	<1
Statewide 2002	98	2	<1	99	1	0
Statewide 2004	97	3	0	98	<1	<1
Internal 1998-2004	97	2.9	<1	98	2	<1

3.3 PROPOSED CONSERVATION STRATEGY FOR SEDIMENT DELIVERY REDUCTION

3.3.1 Proposed Conservation Strategy for Minimizing Roads Used for Forest Management Activities

The proposed conservation strategy to minimize the number of roads necessary to conduct DNRC forest management activities will rely on the existing conservation strategy as described in Section 3.2.1. This strategy consists of ARMs addressing DNRC Road Management (ARM 36.11.421) and Montana Forestry BMPs.

1. DNRC will enhance its current conservation strategy for minimizing roads by committing to monitor implementation of this strategy. This task will be completed by tracking the amount of new road that is constructed, reconstructed, relocated, abandoned, and reclaimed within the HCP project area.

3.3.2 Proposed Conservation Strategy for Reducing Sediment Delivery from Existing Roads

The proposed conservation strategy for reducing sediment from existing DNRC roads will rely primarily on the existing ARMs, BMPs, and policies covering DNRC Forest Management programs as described in Section 3.2.2. These measures already provide a large degree of conservation to HCP fish species and provide a sound basis for meeting the sediment conservation strategy objectives.

The proposed conservation strategy contains several enhancements to the current DNRC program that will provide better assurances that the conservation strategy objectives are being met. These commitments include a timeline for completing road inventories in watersheds supporting HCP fish species, a prioritization scheme for implementing corrective actions, and a timeline for identifying and implementing corrective actions. The proposed enhancements to the proposed conservation strategy for reducing sediment from existing roads are as follows:

1. DNRC will complete inventories of all existing roads used for forest management activities that are within the HCP project area and located within watersheds (sixth-order hydrologic unit code [HUC]) supporting HCP fish species. Roads inventoried will be limited to those roads that DNRC has legal access to, and sole ownership, or cost-share or reciprocal road agreements.

RATIONALE. Roads located within watersheds supporting HCP fish species have the highest potential to affect the HCP species' habitat. Roads within the HCP project area are the focus of the HCP planning process.

2. DNRC will complete road inventories using current methods and procedures. A detailed description of these inventory methods, procedures, and data sheets are contained in Appendix A. These methods and procedures may be revised over time to include further information, to take advantage of new technology, or to gain efficiency. However, the essential elements of the existing inventory will be maintained. Any revision of the methods and procedures will continue to provide all information required for the identification of existing and potential sediment sources and the development of corrective measures.

   RATIONALE. The methods and procedures currently used by DNRC to inventory and assess roads have been widely used by both DNRC staff and contractors. They are similar to methods used by other agencies and private forest managers, and have been demonstrated to be a practical and efficient means for DNRC to collect useful information that is adequate to identify potential sediment problems and maintenance needs.

3. DNRC will complete road inventories on all watersheds supporting bull trout (including core and nodal habitat) during the first 10 years of the HCP.

   RATIONALE. Approximately 1,828 miles of existing road are located within the HCP project area within watersheds supporting bull trout. Many of the road inventories already completed by DNRC were conducted within watersheds supporting bull trout. The precise amount of road inventory already completed in bull trout watersheds has not yet been calculated. However, it is estimated that approximately 65 percent of the 1,466 miles of road already inventoried are within bull trout watersheds. It is therefore reasonable to assume that slightly more than one-half of the road inventories required under this commitment have already been completed. By focusing existing monitoring resources and placing an emphasis on completing road inventories within watersheds supporting bull trout, DNRC will be able to complete inventories on the remaining roads located within bull trout watersheds within the timeframes contained in this commitment.

4. All road inventories will be completed within the first 20 years of HCP implementation.

   RATIONALE. DNRC estimates there are approximately 5,042 miles of existing road on forested trust land parcels statewide. Over the last 9 years, DNRC has completed road inventories on approximately 1,466 miles or 29 percent of these roads under the DNRC State Forest Land Management Plan (SFLMP) Monitoring Program. DNRC has inventoried an average of 163 miles of road per year, or 3.2 percent of the total amount of forest roads annually.

   The actual amount of road to be addressed under this conservation strategy is considerably less than the 5,042 miles of total road located on all forested trust lands. The amount of road that is located in the HCP project area in watersheds supporting HCP fish species is estimated at approximately 2,973 miles. The amount of road inventory completed to-date within watersheds supporting HCP fish species has not been calculated. However, it is estimated that approximately 75 percent of the 1,466 miles inventoried are within watersheds supporting HCP fish species. It is therefore reasonable to assume that almost one-half of the road inventories required under this commitment have already been completed.

   By focusing existing monitoring resources and placing emphasis on completing road inventories within the HCP project area and watersheds supporting HCP fish species, DNRC will be able to complete inventories on the remaining 1,507 miles of road within the timeframes contained in this commitment.

5. Based on the completed road inventories, DNRC will classify all inventoried road segments/sites as either being:

    a) Low risk of sediment delivery: Meets BMPs or has very low risk of sediment delivery.

    b) Moderate risk of sediment delivery: Does not meet BMPs, has moderate risk of sediment delivery, or meets BMPs but is poorly located.

    c) High risk of sediment delivery: Does not meet BMPs, is poorly located, is currently delivering sediment, or has high risk of future sediment delivery.

6. Project-level, site-specific corrective actions would be developed and implemented on sites identified as having a high or moderate risk of sediment delivery. These corrective actions would only occur on roads where DNRC has or could secure legal access, and has sole ownership, jurisdiction and control. These sites would be improved to a level necessary to reduce risk of sediment delivery to streams supporting fish species and to meet or exceed the habitat requirements for HCP fish species. Primary mechanisms to achieve this action are the application of appropriate BMPs, enhanced BMPs, and other site-specific mitigation measures.

7. On roads where DNRC does not have sole ownership, jurisdiction and control, DNRC would work with other cooperators to address road segments identified as having high risk of sediment delivery.

8. Projects will be prioritized by considering the following factors:

    a) watersheds supporting bull trout,

    b) watersheds supporting westslope cutthroat trout or Columbia redband trout,

    c) watersheds supporting other sensitive beneficial uses (e.g., domestic/municipal uses),

    d) watersheds in which total maximum daily loads (TMDLs) are in place, and

    e) 303(d) listed watersheds in need of TMDL development.

9. Corrective actions will be prioritized for implementation within a watershed by:

    a) high-risk sites,

    b) moderate-risk sites, and

    c) low-risk sites whenever feasible.

10. Corrective actions will be completed on all identified sites with high risk of sediment delivery located within bull trout watersheds that are in the HCP project area within 15 years of HCP implementation. Annual updates and the 5-year Monitoring Report will be used to document progress of corrective actions.

    RATIONALE. In the recent past, DNRC has addressed road sediment problems and implemented road improvements on an average of approximately 114 miles of road per year through timber sale contracts and forest improvement projects. These activities included reconstruction, improvements, maintenance, abandonment, and reclamation. Recently completed road inventories indicate that identified high- to moderate-risk problems occurred on less than 5 percent of the total road miles evaluated. Therefore, it is expected that the amount of corrective measures needed to meet this commitment can be accomplished under the existing DNRC forest management program. DNRC timber sale contracts will continue to be the primary mechanism to implement site-specific corrective actions. The road maintenance portion of the forest improvement funds will also be used, whenever available,

for high-priority projects where no timber sale projects are occurring. Other opportunities, such as cooperative agreements and special grants, will be pursued to supplement the funding of corrective actions.

11. Corrective actions will be implemented at all identified high-risk sites in watersheds supporting westslope cutthroat trout or Columbia redband trout within 25 years of HCP implementation. Annual updates and the 5-year Monitoring Report will be used to document progress on these corrective actions

12. DNRC will continue to implement the road sediment source inventories and corrective actions in watersheds supporting HCP fish species throughout the duration of the permit period.

3.3.3 Proposed Conservation Strategy for Reducing Sediment Delivery from New Road Construction, Reconstruction, Maintenance, and Use

The proposed conservation strategy for reducing potential sediment delivery from new DNRC road construction, reconstruction, maintenance, and use will rely primarily on the existing SMZ Law and Rules, ARMs, and policies covering DNRC forest management programs, as described in Section 3.2.3. The existing conservation strategy for addressing these potential sources of erosion and sediment delivery already provides a high degree of conservation to HCP fish species and provides a sound basis for meeting the sediment conservation strategy objectives.

The proposed conservation strategy contains several enhancements to the current DNRC program that will provide clear commitments and better assurances that the conservation strategy objectives will be met. These commitments include a process for ensuring (1) adequate review of proposed road activities potentially affecting HCP fish species habitat by a DNRC water resource specialist, (2) design and implementation of site-specific mitigation measures, and (3) adequate monitoring and adaptive management on both the implementation and effectiveness of the conservation strategy. The enhancements to the proposed conservation strategy are as follows:

1. A DNRC water resource specialist will review road management activities associated with forest management activities that are located within watersheds (sixth-order HUC) supporting HCP fish species. The water resource specialist will make recommendations that would be integrated into the development of road standards, contract specifications, site-specific BMPs, and other mitigation measures. The purpose and role of the specialist reviews are detailed in Commitment #5 of this section. Specific road management activities that will be reviewed by a water resource specialist include:

    a. road construction and reconstruction projects that meet one or more of the following criteria:

        i. greater than 0.5 mile in length, or

        ii. located within the RMZ of a stream supporting an HCP fish species, or

        iii. include the installation of perennial stream crossings, or

        iv. are located on sites with high erosion risk as defined by ARMs.

    b. Road maintenance projects and use of roads for hauling timber harvest greater than 100 thousand board feet (MBF) that involve one or more of the following circumstances:

        i. located within the RMZ of a stream supporting an HCP fish species, or

        ii. include a perennial stream crossing; or

        iii. located on sites with high erosion risk as defined by ARMs.

RATIONALE. Road maintenance and use commitments apply to all forest management road activities. Timber sale permits are generally for less than 100 MBF. The level of watershed resource specialists' involvement on projects of less than 100 MBF will be determined by project foresters.

2. New road locations will avoid high hazard sites that are prone to mass wasting as required in BMP III.A.4. Proposed road locations will be screened during the cumulative watershed effects coarse filter analysis for locations that are associated with slope instability and prone to mass wasting. A DNRC watershed program specialist will review all proposed road locations in the field when a cumulative watershed effects coarse filter analysis indicates that the proposed road is located on sites with high risk of slope instability in watersheds supporting HCP fish species.

3. When new road construction or reconstruction cannot be avoided on potentially unstable slopes, DNRC will design and implement site-specific mitigation measures to reduce the risk of mass wasting.

4. Roads deemed unnecessary for future use that are abandoned or reclaimed will be left in a stable condition that does not require maintenance.

5. DNRC will design and implement site-specific BMPs and other mitigation measures to reduce the risk of sediment delivery to streams affecting HCP fish species to the maximum extent practicable. A DNRC water resource specialist will make recommendations that will be integrated into the development of road standards, contract specifications, site-specific BMPs, and other mitigation measures. In cases where measures necessary to adequately reduce the risk of sediment delivery may not be practical or feasible due to site, funding or other limitations, decision rationale will be documented and provided to the USFWS upon request.

6. DNRC contracts that address forest management activities conducted in watersheds supporting HCP fish species and include road construction, reconstruction, maintenance, and use will include applicable road design specifications and operating requirements. These specifications will include road construction and maintenance standards, resource protection requirements, BMP requirements, special operating and design requirements, and site-specific BMP and mitigation measure specifications.

7. DNRC will administer road construction projects to ensure that contract specifications, BMPs, and other resource protection requirements are met on a weekly basis when road construction and maintenance activities are actively occurring.

8. On sites where practices implemented have resulted in unacceptable levels of impact to soil or water resources, appropriate mitigation and/or rehabilitation measures will be implemented as soon as possible. Examples of unacceptable levels of impact are major departures in BMPs that result in actual sediment delivery to streams or are at high risk of sediment delivery to streams.

   RATIONALE. When specified mitigation measures are incorrectly applied and/or unacceptable impacts occur, DNRC implements corrective actions and/or rehabilitation measures immediately or as soon as possible. These situations are usually identified and resolved during contract administration and may or may not involve technical assistance from the DNRC water resource specialist. Requiring USFWS review and approval of DNRC proposed corrective measures would delay corrective and rehabilitation actions from being implemented. The potential delays caused by a review period would likely result in higher levels of impact and more costly implementation.

3.3.4 Proposed Conservation Strategy for Reducing Potential Sediment Delivery from Timber Harvest, Site Preparation, and Slash Treatments

The proposed conservation strategy for reducing potential sediment delivery from DNRC timber harvest activities (harvest, yarding, site preparation, and slash treatment) focuses on reducing the levels of soil disturbance and subsequent levels of erosion and providing buffers zones for effective filtration of sediment. The proposed strategy will rely primarily on the existing SMZ Law and Rules, ARMs, Montana Forestry BMPs, and other policies covering the DNRC forest management programs, as described in Section 3.2.4. These existing measures already provide a high degree of conservation to HCP fish species.

The proposed conservation strategy also contains several enhancements to the current DNRC program that will provide clear commitments and better assurances that the conservation strategy objectives will be met. These commitments include: (1) providing a process for ensuring adequate review by a DNRC water resource specialist of harvest activities potentially affecting HCP fish species habitat, (2) designing and implementing site-specific mitigation measures, and (3) providing adequate feedback using both implementation and effectiveness monitoring. The enhancements to the proposed conservation strategy are as follows:

1. A DNRC water resource specialist will review all proposed timber harvests that are greater than 100 MBF located within a watershed supporting an HCP fish species. The water resource specialist will make recommendations that would be integrated into the development of road standards, contract specifications, site-specific BMPs, and other mitigation measures. The purpose and role of the specialist reviews are detailed in Commitment #4 of this section. Exceptions to this level of review will occur in situations or circumstances that are determined to have low risk of substantial soil disturbance. Low risk will be determined after consulting with a DNRC water resource specialist. An example of a situation that would not require field review by a waters resource specialist might include activities such as RMZ salvage harvest from an existing road or other situations that are low-risk for soil disturbance.

2. Timber harvests that are proposed on high-hazard sites will be screened during the cumulative watershed effects coarse filter analysis as outlined in the Cumulative Watershed Effects Conservation Strategy (Section 6). A DNRC watershed program specialist will conduct a field review of all proposed harvest locations when cumulative watershed effects coarse filter analysis indicates that the proposed timber harvests are located on sites with high risk of slope instability and are prone to mass wasting.

3. When timber harvests are conducted on unstable slopes, DNRC will modify harvest prescriptions and/or design and implement mitigation measures to avoid increasing the risk of mass wasting.

4. DNRC will design and implement timber sale contract specifications, special timber harvest operation requirements, site-specific BMPs, and other mitigation measures to reduce the risk of sediment delivery to streams affecting HCP fish species to the maximum extent practicable. A DNRC watershed program specialist will make recommendations that would be integrated into the development of contract specifications, special operating requirements, site-specific BMPs, and other mitigation measures. In cases where measures necessary to adequately reduce the risk of sediment delivery may not be practical or feasible due to site, funding or other limitations, decision rationale will be documented and provided to the USFWS upon request.

5. Contracts addressing DNRC timber harvest and associated forest management activities will include applicable standard operating requirements and restrictions, special operating requirements and restrictions, BMPs, and site-specific mitigation measures designed to avoid, minimize or mitigate the risk of sediment delivery to streams affecting HCP fish species.

6. DNRC will administer timber sale projects to ensure that contract specifications, BMPs, and other resource protection requirements are met.

7. DNRC will complete contract inspections during routine contract administration. DNRC will document the levels of compliance with contract specifications and requirements.

8. On sites where practices implemented have resulted in unacceptable levels of impact to soil or water resources, appropriate mitigation and/or rehabilitation measures will be implemented as soon as possible. Examples of unacceptable levels of impact are major departures in BMPs that result in actual sediment delivery to streams or are at high risk of sediment delivery to streams.

   RATIONALE. When specified mitigation measures are incorrectly applied and/or unacceptable impacts occur, DNRC implements corrective actions and/or rehabilitation measures immediately or as soon as possible. These situations are usually identified and resolved during contract administration and may or may not involve technical assistance from the DNRC water resource specialist. Requiring USFWS review and approval of DNRC proposed corrective measures would delay corrective and rehabilitation actions from being implemented. The potential delays caused by a review period would likely result in higher levels of impact and more costly implementation.

3.4 PROPOSED MONITORING AND ADAPTIVE MANAGEMENT

3.4.1 Monitoring and Adaptive Management Commitments for Minimizing Roads Used for Forest Management Activities

1. DNRC will monitor the conservation strategy for minimizing roads by tracking the amount of road that is newly constructed, reconstructed, relocated, abandoned, and reclaimed within the HCP project area. This would also include tracking the amount of reduction in roads with high-risk sites. DNRC will provide the USFWS with updates for these activities in each 5-year HCP Monitoring Report.

3.4.2 Monitoring and Adaptive Management Commitments for Reducing Sediment Delivery from Existing Roads

1. DNRC will provide the USFWS with an update on all ongoing inventory activities at the annual meeting. The monitoring updates will consist of a summary of the status of all planned, ongoing, and recently completed inventory projects. Each 5-Year Monitoring Report will include more detailed information, including the number of road miles inventoried and the number of road miles that are classified as low, moderate, and high risk.

2. DNRC will complete road inventories on all watersheds supporting bull trout (including core and nodal habitat) during the first 10 years of the HCP. Update on the progress of this commitment will be submitted to the USFWS in each 5-Year Monitoring Report.

3. Corrective actions will be implemented on all identified sites with high risk of sediment delivery located in the HCP project area in bull trout watersheds within 15 years of HCP implementation. Updates on the progress of this commitment will be submitted to the USFWS in each 5-Year Monitoring Report.

4. Corrective actions will be implemented at all identified high-risk sites in watersheds supporting westslope cutthroat trout or Columbia redband trout within 25 years of HCP implementation. Updates on the progress of this commitment will be submitted to the USFWS in each 5-Year Monitoring Report.

5. DNRC will continue to implement the road sediment source inventories and corrective actions in watersheds supporting HCP fish species throughout the duration of the permit period. Updates on the progress of this commitment will be submitted to the USFWS in each 5-Year Monitoring Report.

3.4.3 Monitoring and Adaptive Management Commitments for Reducing Sediment Delivery from New Road Construction, Reconstruction, Maintenance, and Use

1. Qualitative assessments, including statewide and DNRC internal BMP audits and contract administration inspections, will be conducted on all forest management activities that involve the levels of road construction and reconstruction defined in this section. These assessments will be used to evaluate the implementation and effectiveness of all applicable BMPs. BMPs that fail to provide adequate protection of water resources and HCP fish species will be revised and reported to the USFWS.
2. Documentation of contract inspections will be completed during routine contract administration to determine the levels of compliance with contract specifications and requirements.
3. At the annual HCP review meeting, DNRC will update the USFWS on the status of projects related to the design and implementation of mitigation measures that reduce the risk of mass wasting in areas where new road construction or reconstruction cannot be avoided on potentially unstable slopes. DNRC will provide USFWS documentation of adequate road design and mitigation measures.
4. Site-specific monitoring projects using quantitative assessment methods will be implemented on selected sites to determine the effectiveness of BMPs and other mitigation measures. DNRC will have a minimum of two ongoing quantitative sediment monitoring projects at any one time. Sites monitored under this commitment may also be used in the monitoring commitment contained in Section 3.4.4-3. BMPs that fail to provide adequate protection of soil and water resources and HCP fish species will be revised and reported to the USFWS.
5. DNRC will provide the USFWS with updates on all sediment monitoring and implementation activities and issues at the annual update and 5-year monitoring meetings (details to be provided in the Itemized Monitoring Table, which is currently being formulated and will be included in the Draft HCP). Minor reporting will be performed on an annual basis; major reporting will be performed every 5 years. Annual reports will consist of a written summary of the status of all monitoring projects and activities and will include information, such as where monitoring was completed and the type of data collected. Each 5-Year Monitoring Report will include detailed monitoring analysis and results.

3.4.4 Monitoring and Adaptive Management Commitments for Reducing Potential Sediment Delivery from Timber Harvest, Site Preparation, and Slash Treatments

1. At the annual HCP review meeting, DNRC will update the USFWS on the status of projects related to this specific commitment and provide documentation of adequate designs and mitigations.
2. Qualitative assessments, such as BMP audits and timber sale inspections, will continue to be conducted on all timber harvest and associated forest management activities for all timber sales and permits greater than 100 MBF. A minimum of 12 BMP audits, one on each DNRC administrative unit with an active timber sale program, will be conducted annually. These

assessments will be used to evaluate the implementation and effectiveness of all applicable BMPs. BMPs that fail to provide adequate protection of water resources and HCP fish species will be revised. Descriptions of the revisions will be included in each 5-Year Monitoring Report.

3. Site-specific monitoring projects using quantitative assessment methods will be implemented on selected sites to determine the effectiveness of BMPs and other mitigation measures. DNRC will have a minimum of two ongoing quantitative sediment monitoring projects occurring during any given period of time (for example, during a field season). Higher-risk sites will be given priority for this type of monitoring. Higher-risk sites include, but are not limited to, stream crossings, roads located on unstable slopes, and roads located immediately adjacent to streams. Sites monitored under this commitment may also be used in the monitoring commitment contained in Section 3.4.3-4. The assessments will be used to evaluate the effectiveness of BMPs and other commonly used site-specific mitigation measures. Practices and measures that fail to provide adequate protection of water resources and HCP fish species and habitat will be revised and reported to USFWS.

4. DNRC will provide the USFWS with updates on all sediment monitoring and implementation activities, and issues at the annual update and 5-year monitoring meetings (details to be provided in the Itemized Monitoring Table, which is currently being formulated and will be included in the Draft HCP). Minor reporting will be performed on an annual basis; major reporting will be performed every 5 years. Annual reports will consist of a written summary of the status of all monitoring projects and activities and will include information such as where monitoring was completed and the type of data collected. Each 5-Year Monitoring Report will include detailed monitoring analysis and results.

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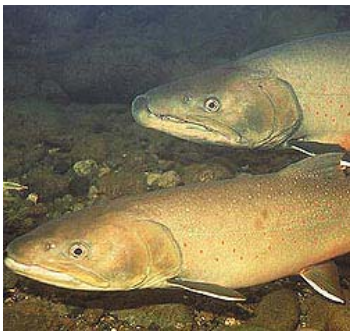

Section 4
Fish Connectivity Conservation Strategy

4. FISH CONNECTIVITY CONSERVATION STRATEGY

4.1 CONSERVATION STRATEGY OVERVIEW AND RATIONALE

The critical ecological function specifically addressed in this strategy is fish connectivity. The strategy is formulated to address barriers to HCP fish species that prevent or impede fish migration upstream or downstream. For the purposes of the HCP, the connectivity conservation strategy focuses exclusively on road-stream crossings. In some cases (i.e, to prevent hybridization, predation, and the spread of disease), it may be desirable to prevent connectivity by maintaining or fortifying existing barriers at road-stream crossings. For example, it may be important to maintain barriers between non-introgressed westslope cutthroat trout and potentially hybridizing species. The establishment of connectivity or maintenance of isolation will be made on a case-by-case basis for each site using a review process performed in collaboration with MFWP and other stakeholders.

The proposed conservation strategy has evolved from an assessment of DNRC's existing conservation strategies, identified gaps in existing strategies, and new management concepts. These ideas and guidance are summarized in this report and are explored in detail in Bower (2004). The findings of the technical report lead to a basis for the proposed conservation strategy that facilitates naturally occurring levels of connectivity for all life stages of HCP fish species. DNRC will provide connectivity by designing fish passage structures to accommodate the background levels of streambed form and function that would otherwise occur at the site. By emulating these streambed processes, ordinary stream habitat features and properties will develop in a crossing structure, thereby allowing naturally occurring levels of connectivity. The conservation strategy will ensure connectivity from low to bankfull flows since it is during these periods that the vast majority of migration occurs for HCP fish species. Stream crossings will be designed to accommodate flows, and consequently streambed functions, during runoff events that are greater than bankfull flows (for example, 25-, 50-, or 100-year flow events). These concepts are consistent with the DNRC HCP aquatic biological goal and objectives and provide a firm foundation to serve as the basis for the connectivity conservation strategy.

As a first step in this process, DNRC has launched the DNRC Fish Passage Assessment Project as a means to inventory and analyze all road-stream crossings where native fisheries connectivity is an issue on forested state trust lands. As of April 2005, over 95 percent of the applicable road-stream crossing sites in the project area have been inventoried and analyzed. The final phase of the project includes an inventory and analysis of 13 road-stream crossing sites during the summer/fall of 2005. The four objectives of the project are to: (1) establish an inventory of every road-stream crossing within known and suspected native fisheries habitat, (2) collect sufficient detailed information from each site to facilitate an accurate assessment of connectivity, (3) conduct detailed analysis of each site and compile results into a database, and (4) develop a maintenance planning schedule focusing on the status of the stream crossings and the need to provide connectivity at those sites. A detailed description of the project protocol is provided in Bower (2004).

Using this inventory information, DNRC will prioritize road-stream crossing improvements based on existing levels of connectivity, as well as species status and conservation goals established collaborately with MFWP and other stakeholders. Prioritization will be conducted on two levels: a (1) coarse filter based on species presence and genetic data, and (2) a fine filter based on overall conservation objectives and current levels of connectivity provided to the different life stages of HCP fish species found in the stream.

When all sites are prioritized, DNRC will set target rates for road-stream crossing improvements that are based on a timetable that will allow connectivity of adult and juvenile HCP fish species during low to bankfull flows within 30 years of HCP implementation. DNRC will commit to specific improvement rates

over this time period. In addition, all high-priority sites will be improved within 15 years of HCP implementation.

DNRC has also formulated design options by preference and feasibility. However, the selection of a road-stream crossing design will be determined by DNRC and based on stream channel form and function, flow regimes, costs, anticipated use, and regulatory approval.

To verify that the proposed strategy adequately provides the connectivity conditions necessary for HCP fish species, DNRC will conduct post-installation effectiveness monitoring at all new road-stream crossings where HCP fish species connectivity has been facilitated. The monitoring schedule will include assessments at 2, 5, and 10 years following installation, as well as inspections after large flood events.

The connectivity conservation strategy also incorporates adaptive management practices by using the best available technology and research to assess connectivity at existing road-stream crossings, by reevaluating site prioritization status, and continuing to evaluate new installation methods or techniques for providing connectivity. As part of adaptive management, DNRC has committed to prescribed actions to correct deficiencies if a new installation fails to emulate streambed form and function (as determined by post-installation effectiveness monitoring) as well as a reporting schedule with USFWS to review and discuss HCP connectivity issues.

4.2 EXISTING DNRC CONSERVATION STRATEGY

There are eight existing conservation strategies that provide DNRC some level of management direction for bull trout, westslope cutthroat trout, and Columbia redband trout connectivity:

- ARMs – 36.11.422, 36.11.427, 36.11.428, 36.11.436;
- Montana Forestry BMPs – VA2, VC2, VC3, VD1;
- Montana Stream Protection Act – MCA 87-5-501 to 87-5-509 (including MFWP; administration of the 124 permit process and draft internal stream permitting policies);
- Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin, Montana (MBTRT 2000);
- MOU and Conservation Agreement for Westslope Cutthroat Trout in Montana (MFWP 1999);
- Draft USFWS Bull Trout Recovery Plan (2002); and
- existing institutional practices.

These existing conservation strategies are directly or indirectly tied to one another, but no strategy has identified a clear and detailed set of standards for providing connectivity for bull trout, westslope cutthroat trout, and Columbia redband trout. The lack of a unified approach among the strategies for managing connectivity also complicates associated decision making processes, allowing for inconsistent 124 permit prescriptions throughout the different regions of Montana.

To establish long-term guidance for the management of connectivity, DNRC must interpret the overall intent of the existing strategies. Given that the Forest Management ARMs eventually direct a DNRC resource specialist to multiple prescriptions and goals for bull trout, westslope cutthroat trout, and Columbia redband trout connectivity, the logical existing conservation strategy may be the sum of the highest potential prescriptions and goals. Since existing BMPs and the Stream Protection Act language collectively provide a regulatory framework for the highest prescriptions and goals, the existing strategy for new and existing structures is essentially to ensure fisheries connectivity for all species and life stages. The following regulatory requirements are applicable to fish connectivity.

- **ARM 36.11.422(2)** – The department shall incorporate BMPs into the project design and implementation of all forest management activities.
- **ARM 36.11.427(4)** – When installing new stream crossing structures on fish-bearing streams, the department shall provide for fish passage as specified in 8[7]-5-501, MCA, the Stream Protection Act (124 permits).
- **BMP VC2** – Design stream crossings for adequate passage of fish (if present) with minimum impact on water quality. When using culverts to cross small streams, install those culverts to conform to the natural stream bed and slope on all perennial streams and on intermittent streams that support fish or that provide seasonal fish passage. Ensure fish movement is not impeded. Place culverts slightly below normal stream grade to avoid outfall barriers.
- **MCA 87-5-501 – State Policy.** It is hereby declared to be the policy of the state of Montana that its fish and wildlife resources and particularly the fishing waters within the state are to be protected and preserved to the end that they be available for all time, without change, in their natural existing state except as may be necessary and appropriate after due consideration of all factors involved.

4.3 PROPOSED CONSERVATION STRATEGY FOR FISH CONNECTIVITY

1. The proposed conservation strategy for connectivity applies to HCP covered lands and those roads and stream crossings that DNRC has access to and jurisdiction over. Jurisdiction includes those cost-share roads where DNRC has a greater than 50 percent ownership.

   RATIONALE. DNRC will retain an interest in the maintenance, rebuilding, or construction of high standard road-stream crossings that accommodate native fish passage on project area roads where DNRC has a 50 percent or less ownership. DNRC simply cannot commit this connectivity strategy to those road-stream crossings where there is no definitive legal access and control through the foreseeable term of the plan.

2. DNRC will provide connectivity to adult and juvenile bull trout, westslope cutthroat trout, and Columbia redband trout during low to bankfull flows by emulating streambed form and function at stream crossings. DNRC will use the best available design technology while considering site conditions and cost efficiencies.

   RATIONALE. There are two approaches for providing fisheries connectivity during the design phase of stream crossing structures: direct and indirect. Directly providing connectivity involves designing a structure to specifically accommodate the passage of select species and life stages throughout some range of flows. Since the detailed study of bull trout, westslope cutthroat trout, and Columbia redband trout swim performances while migrating through difficult hydraulics under varying environmental conditions is a research gap, this is not an ideal approach. Indirectly providing connectivity first involves designing a structure to accommodate the background levels of streambed form and function that would otherwise occur at the site. By emulating these streambed processes, ordinary stream habitat features and properties evolve in a crossing structure, thereby allowing naturally occurring levels of connectivity.

   The conservation strategy will ensure connectivity from low to bankfull flows since it is during these periods when the vast majority of bull trout, westslope cutthroat trout, and Columbia redband trout migrations occur. Streambed form and function throughout a crossing structure can then be ensured. Road-stream crossings will be designed to accommodate flows during runoff events that are greater than bankfull flows (for example, 25-, 50-, or 100-year flow events), which will in turn accommodate the majority of streambed functions.

This particular approach for integrating connectivity in new stream structures is beginning to be embraced by 124 permit issuers throughout the state. Design specifications that are meant to achieve the same intent of this conservation strategy are likely to be included in nearly all 124 permits in the future.

3. Inventory and assess for connectivity all existing stream crossings on known and presumed bull trout, westslope cutthroat trout, and Columbia redband trout habitat that were not surveyed during the DNRC Fish Passage Assessment Project. Foster cooperative relationships with other agencies and landowners to further refine the status and prioritization of bull trout, westslope cutthroat trout, and Columbia redband trout connectivity on the watershed scale.

   RATIONALE. The DNRC Fish Passage Assessment Project is in the process of addressing the major informational gap in the conservation strategy, which is determining the scope of existing bull trout, westslope cutthroat trout, and Columbia redband trout connectivity on state trust lands. Furthermore, the project will also provide the information needed to prioritize road-stream crossing sites for improvement and establish implementation targets over time.

   Fostering cooperative relationships with other agencies and landowners will further expedite bull trout, westslope cutthroat trout, and Columbia redband trout conservation by bringing into light the status of road-stream crossings on adjacent ownerships. This expanded field of assessment will help ensure greater accuracy in the planning schedule and the success of shared interagency goals for connectivity. This effort also recognizes the importance of connectivity within an entire watershed, despite a mixed ownership pattern.

4. Prioritize road-stream crossing improvements based on existing levels of connectivity, as well as species status and population conservation goals established while taking into consideration other regulatory agencies' or cooperative organizations' activities and goals. Genetic data used for a coarse filter will be obtained primarily from MFWP data sets. Where practicable and time permitting, DNRC will collaborate with MFWP to collect species genetics information to supplement those data sets.

   a. Coarse filter

      i. Priority 1 – Habitat includes any bull trout life stage.

      ii. Priority 2 – Habitat includes 100 percent genetically pure westslope cutthroat trout or Columbia redband trout.

      iii. Priority 3 – Habitat includes westslope cutthroat trout or Columbia redband trout of unknown genetic purity.

      iv. Priority 4 – Habitat includes 80 to 99 percent genetically pure westslope cutthroat trout or Columbia redband trout.

   b. Fine filter (within priority groups)

      i. Determine if the proposed action of culvert removal or replacement meets conservation objectives (i.e., prevention of genetic introgression or displacement by nonnative species) while considering the goals of MFWP, USFWS, and other appropriate organizations (See (5) below).

      ii. Determine the status of existing connectivity for different life stages at varying flows through model outputs, field verification, and other available data.

      iii. Crossing site improvements may also be prioritized based on management opportunities, such as associated timber sales and other projects, forest improvement funds, grant availability, and structural failure due to catastrophic natural events.

RATIONALE. Use of a dynamic planning schedule that incorporates both coarse and fine filters will provide for maximum efficiency and effectiveness in addressing different species' connectivity status and concerns. This planning schedule will also account for changing interagency conservation goals and improvement opportunities developed from the availability of different funding sources.

5. DNRC will maintain a planning schedule that contains a list of road-stream crossing sites to be addressed by this conservation strategy. The planning schedule will identify current site prioritizations, potential mechanisms for implementation, and project status. The schedule will be reviewed annually and updated as new road-stream crossing sites are identified, there are changes in crossing status, new information becomes available, or improvements are completed. DNRC will provide this planning schedule to MFWP, USFWS, and other appropriate organizations in order to effectively collaborate with adjacent landowners and other agencies on bull trout, westslope cutthroat trout, and Columbia redband trout conservation objectives.

6. All Priority 1 sites that are determined to require connectivity will be improved within 15 years of HCP implementation.

7. All road-stream crossings will allow connectivity of adult and juvenile bull trout, westslope cutthroat trout, and Columbia redband trout during low to bankfull flows within 30 years of HCP implementation, except in those cases identified in (4)(b)(i).

   RATIONALE. Culvert lifespan is primarily a function of culvert material, culvert coatings, water chemistry, soil resistivity, and abrasion. Due to the variability of environmental conditions, galvanized steel culverts generally have a lifespan of 20 to 100 years under controlled conditions (NCSPA 2000). Land use specialists with DNRC have found the average lifespan of steel culverts to be 30 to 35 years. It is therefore presumed that most, if not all, existing culverts on DNRC holdings would be replaced or removed within that timeframe.

   The planning methodology for establishing the 15-year and 30-year target rates of site improvements as outlined in above in (6) and (7) will: (1) ensure that all road-stream crossing sites on forested state trust lands meet objectives for connectivity within the timeframe of the HC;, (2) accommodate a yet unknown number of sites that do not meet the objectives for connectivity; (3) maintain a steady rate of site improvement; and (4) provide allowances for economic fluctuations, funding and project availability, logistical issues, and timing of associated local road maintenance projects.

8. Every 5 years, one-sixth of all sites that do not meet the objectives of the conservation strategy as determined by the DNRC Fish Passage Assessment Project will be improved to meet the conservation strategy or, at a minimum, have final plans and designs for improvements to meet the conservation strategy.

   a. If, due to initial programmatic adjustments in implementing the HCP, the first one-sixth of the sites cannot be improved in the first 5-year period, then those sites will be improved within 10 years of HCP implementation. Sites that may be delayed under this scenario would be improved in addition to other sites selected for improvement during the second 5-year period.

9. The selection of a road-stream crossing design on streams supporting HCP fish species will be determined by DNRC based on stream channel form and function, costs, and anticipated use. The selection of site-specific stream crossing designs is contingent upon approval by regulatory permitting authorities. In order of preference and feasibility, design options will include:

   a. permanent structure removal,

   b. temporary bridges,

c. permanent bridges,

d. bottomless arch culverts,

e. fords: (1) reinforced fords such as armored fords and (2) fords with streambeds suitable to handle predicted loads (both are generally only feasible in low-traffic areas),

f. box culverts (only in low-gradient streams where substrate retention can be ensured through sufficient culvert embeddedness),

g. round or elliptic corrugated metal pipe (CMP) – channel simulation design (Bates et al. 2003),

h. round or elliptic CMP – no-slope design (design option only for streams where gradients are generally less than 3 percent) (Bates et al. 2003), and

i. round or elliptic CMP –hydraulic design (Bates et al. 2003).

RATIONALE. All the above design options can provide for streambed form and function emulation while accommodating economic feasibility, the availability of different funding sources, and varying environmental conditions from site to site.

10. Road-stream crossings constructed on streams with bull trout, westslope cutthroat trout, and Columbia redband trout habitat will include the following additional mitigations:

    a. Construction windows are generally July through mid-August (within habitat occupied by bull trout), July through November (within habitat occupied by westslope cutthroat trout or Columbia redband trout), or as specified by MFWP in a 124 permit.

    b. DNRC will implement reasonable measures to exclude and/or salvage fish from construction sites.

    c. As practicable and economically feasible, stream flows will be rediverted through newly constructed crossing structures to allow engineered substrates to adjust to stream energies and processes.

    d. Montana Forestry BMPs will be met or exceeded at each site during and after modification or construction. A DNRC contract administrator will be present during all fish passage installations. The application of BMPs will occur during contract administration and after site modification or construction. Contract administrators will have the authority to halt or modify a project if BMPs are not being achieved during construction. Additional BMP implementation and effectiveness monitoring is addressed in the sediment conservation strategy.

    e. DNRC will provide training on fish connectivity design and construction techniques for field staff responsible for fish passage installations. Training will occur early in the implementation of the HCP. Additional training will be provided as new technologies become available or there are changes in personnel.

    Regarding the rediversion of stream flows through a newly constructed crossing structure, diligence during the final phases of construction when stream flows are rediverted into crossing structures can help ensure proper sealing of engineered substrates and prevent costly reinstallation of substrate material. This practice is most appropriate where higher stream energies and steeper gradients occur.

    RATIONALE. These additional mitigations are designed to minimize to the greatest extent possible any impacts to HCP fish species habitat, as a result of construction associated with a site improvement.

4.4 PROPOSED MONITORING AND ADAPTIVE MANAGEMENT

1. Post-installation effectiveness monitoring will occur at all new road-stream crossings where bull trout, westslope cutthroat trout, or Columbia redband trout connectivity has been facilitated. This monitoring will include qualitative assessments of the structure's capabilities to accommodate background ranges of different stream forms and functions. Variables to be assessed at and within the road-stream crossing include substrate distribution and composition, step/pool frequency, natural distribution of habitat features, presence of channel head cutting, bank erosion, and uncontrolled scour. The qualitative assessments will be added to site project files. The road-stream crossing structure is presumed to provide naturally occurring levels of connectivity if background ranges of stream form and functions are determined to be emulated within and immediately adjacent to the structure. The monitoring schedule will include the following:

    a. First post-construction assessment within 2 years by a DNRC water resource specialist.

    b. A subsequent post-construction assessment of CMP installations will occur within 5 years following the first post-construction assessment.

    c. Subsequent post-construction assessments of all other installations will occur within 10 years following the first post-construction assessment.

    d. Stream crossing structures facilitating bull trout, westslope cutthroat trout, or Columbia redband trout connectivity will be evaluated for damage after experiencing a known 25-year or greater flood event.

    RATIONALE. The failure of a stream crossing structure to facilitate bull trout, westslope cutthroat trout, or Columbia redband trout connectivity will generally occur within 2 years if improperly installed. By conducting the first post-construction assessment within 2 years of installation, the flows that would generally cause a site to fail should have occurred.

2. Adaptive management includes:

    a. The best available technology and research will be used for (1) new criteria or models to assess connectivity at existing road-stream crossings; (2) reevaluating site prioritization due to updates or changes in species' status, population trends, or other information; and (3) newer and more cost-effective installation methods or techniques for providing connectivity.

    b. If a new installation fails to emulate streambed form and function as determined by post-installation effectiveness monitoring, the following remediation process would be implemented: (1) a new technical survey of the affected stream reach would be conducted, (2) the cause of the problem(s) would be determined within 1 year of the discovery of the failure, and (3) the site reinstallation would be scheduled according to the current planning schedule.

    c. DNRC will provide the USFWS with updates on all connectivity monitoring and implementation activities and issues at the annual update and 5-year monitoring meetings (details to be provided in the Itemized Monitoring Table, which is currently being formulated and will be included in the Draft HCP). Minor reporting will be performed on an annual basis; major reporting will be performed every 5 years. Annual reports will consist of information on accomplishments, status of ongoing projects, and current planning schedules. Each 5-Year Monitoring Report will include detailed monitoring analysis and results.

4.5 REFERENCES

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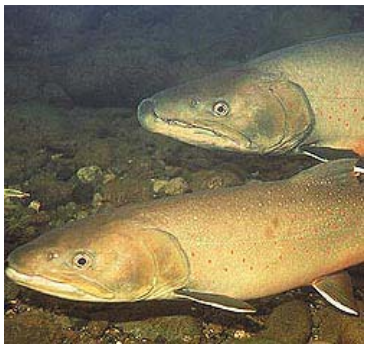

Section 5
Grazing Conservation Strategy
(on Classified Forest Lands)

5. GRAZING CONSERVATION STRATEGY (ON CLASSIFIED FOREST LANDS)

5.1 CONSERVATION STRATEGY BACKGROUND AND RATIONALE

This report includes a summary of the proposed grazing conservation strategy for addressing DNRC grazing management on classified forest state trust lands that affect covered fish species. The proposed HCP grazing conservation strategy applies only to grazing licenses issued on DNRC classified forest state trust lands. This conservation strategy does not apply to grazing leases issued on DNRC classified grazing or classified agricultural lands. Grazing licenses and grazing leases are administered and managed under separate planning processes. Grazing licenses are associated with DNRC forest management activities and are therefore included in the HCP because they are addressed in the DNRC SFLMP and ARMs for forest management on state trust lands (Forest Management Rules).

Under this strategy, DNRC will follow the existing grazing inspection and monitoring program as a coarse filter to identify potential problem areas. The new concepts developed under this aquatic conservation strategy for grazing focuses on a process and timeline for defining acceptable levels of livestock use and impact, verification and prioritization of problems that will affect HCP species, development and implementation of corrective actions to decrease effects to HCP fish species, and follow-up with implementation and effectiveness monitoring.

This approach will allow DNRC to quickly identify and then eliminate or minimize unacceptable grazing effects to HCP fish species or their habitat. The process is specifically designed for application to grazing activities and incorporates scientifically defensible numerical and narrative criteria in a coarse filter approach that will describe general acceptable levels of livestock use and identify potential problem areas. There is considerable support for these criteria referenced in the scientific literature (Ehrhart 1997, 1998) and they are very similar if not identical to the criteria used in the Plum Creek Timber Company Native Fish Species HCP (Plum Creek 2000), the Montana State Office of the U.S. Department of Agriculture (USDA), National Resource Conservation Service (NCRS) (USDA 2003), and the Beaverhead Forest Plan Riparian Amendment (USDA 1997), and recommended by the now-defunct University of Montana Riparian and Wetland Research Unit (Thompson 1998). Furthermore, the coarse filter process directly addresses existing riparian conditions and assesses project risk to specific habitat elements, such as streambank stability and riparian vegetation.

However, it should be noted that while these standards provide a useful reference point in identifying potential problems and determining relative risk, indices of healthy and functioning riparian communities, streambank stability, and acceptable levels of impact must be ultimately determined on a site-specific basis. The proposed conservation strategy accomplishes this by addressing potential problems through field verification and corrective action. During the process, site-specific information is collected to more clearly define the problem and develop solutions that are best suited to the circumstances involved. Licensees and other DNRC resource specialists can be brought into the process to help craft solutions that are both reasonable and practical while still meeting conservation objectives.

The proposed conservation strategy is designed to identify and address grazing problems and thereby ensure that DNRC grazing management practices minimize loss of riparian vegetation, minimize physical damage to streambanks, maintain channel stability and channel morphological characteristics, and promote diverse and healthy riparian plant communities. These concepts are consistent with the DNRC HCP aquatic biological goal and objectives and provide a firm foundation to serve as the basis for a grazing conservation strategy. The strategy is expected to contribute to Montana DNRC HCP biological objectives for temperature; sedimentation; habitat complexity; and channel form, function, and stability.

5.2 EXISTING DNRC CONSERVATION STRATEGY

The proposed DNRC HCP grazing conservation strategy is based on the existing ARMs. The basic premise of the existing rules is to ensure that grazing management practices minimize the loss of riparian vegetation, minimize physical damage to streambanks, maintain channel stability and channel morphological characteristics, and promote diverse and healthy riparian plant communities.

There are currently 261 grazing licenses issued on 454 separate parcels of classified forested state trust lands administered by DNRC. Approximately 198,907 acres of classified forested state trust lands are under grazing licenses. Approximately 154 of the 454 parcels of classified forested state trust land that have grazing licenses contain a segment of stream known to support at least one of the three fish species proposed for coverage under the DNRC HCP. These 154 parcels contain approximately 42 miles of stream supporting bull trout, 107 miles of stream supporting westslope cutthroat trout, and 1 mile of stream supporting Columbia redband trout. See Appendix B for a summary of DNRC grazing licenses affected by bull trout, westslope cutthroat trout, and Columbia redband trout distributions.

In addition to lands licensed for grazing, some DNRC classified forest parcels are occasionally subject to unauthorized livestock use. Most DNRC classified forest parcels are subject to an open range law that requires landowners who do not wish to allow livestock grazing on their land to fence the livestock out. Because of this law, simply canceling a grazing license or deciding not to license a parcel for grazing use does not ensure the absence of livestock. Without an active grazing license, large investments in fencing and maintenance would be necessary to keep open range cattle off DNRC lands without the benefit of license income.

The Agriculture and Grazing Management Bureau within the Trust Land Management Division of DNRC administers grazing licenses issued on state trust lands. Grazing licenses may be issued for a term between 1 and 10 years. Most grazing licenses are issued for 10-year terms. In all cases, grazing licenses expire on February 28 of the expiration year. All DNRC grazing licenses specify the carrying capacity of the parcel in animal unit months (AUMs) and the allowable season of use. Grazing licenses may also contain stipulations that address problems or corrective actions necessary to prevent or mitigate previous or existing impacts.

Detailed grazing inspections are conducted on each licensed parcel during the field season prior to license renewal. During these inspections, DNRC determines stocking rates for the licensed parcel, identifies potential problems related to the overall conditions of the tract, checks conditions of any existing improvements, and identifies the need for any additional improvements. Stocking rates are based on the grazing capacity of the licensed parcel. Grazing capacity is the maximum number of animals that can graze each year on a given area of land, for a specific number of days, without inducing a downward trend in forage production, forage quality, or soil. Grazing capacity determinations are based on existing range conditions, which are estimated through visual assessment of existing plant species composition compared to potential plant species composition (climax range condition). The methods used for these determinations are based on guidelines developed by the USDA NRCS. All information collected during the grazing license renewal inspections is recorded on a DNRC Field Evaluation Form (see Appendix B).

The SFLMP established both narrative standards and numeric criteria for grazing management on classified forest state trust lands. These standards address the determination of initial stocking rates and acceptable levels of riparian use and streambank impact and specify the roles of both DNRC and licensees in identifying and mitigating problems. The SFLMP also initiated the requirement for DNRC to evaluate grazing licenses mid-term between license renewal inspections. A Supplemental Grazing Evaluation Form (see Appendix B) was developed for use in assessing riparian and streambank conditions during both grazing license renewal and mid-term inspections. Instructions for completing the Supplemental Grazing Evaluation Form are contained in Appendix B.

Noxious weeds are also evaluated during both license renewal and mid-term grazing evaluations (see Appendix B – DNRC Noxious Weed Inventory/Management Form). During license renewal inspections, the location of noxious weeds and existing control strategies are noted on the standard DNRC Field Evaluation Form. During mid-term grazing inspections, a DNRC Noxious Weed Inventory/Management Form is completed. See Appendix B for DNRC Noxious Weed Inventory/Management Form Instructions. Appendix B also contains a list of list of Montana noxious weeds by county.

Potential problems may be identified and addressed at any time during the license term. However, most problems are likely to be identified during the renewal or mid-term inspections. Mechanisms for addressing issues may involve shortening the license term, reducing numbers of livestock, changing season of use, increasing monitoring, recommending other changes in grazing management or grazing practices, or in rare cases, canceling the license. The number of AUMs issued under a grazing license is generally relatively low. Therefore, it is often difficult to make improvements cost-effective. Cancellation of a grazing license often will not solve the problems because of the open range legal situation and the need for active licensees to effectively maintain fences and other improvements.

The numeric criteria used in the SFLMP were largely adapted from interim standards that were being used by the USFS during the development of the Beaverhead Forest Plan Riparian Amendment. The numeric criteria contained in the SFLMP resource management standards were based on the most stringent numeric criteria developed by USFS for the most sensitive beneficial use categories.

The one-size-fits-all approach used in the SFLMP numeric criteria was very difficult to implement and not necessarily applicable nor appropriate for all riparian areas or all situations. Therefore, the ARMs were designed to capture the philosophy of the SFLMP by retaining narrative criteria and concepts contained in the plan, but dropping the specific numeric criteria to provide more flexibility for site-specific circumstances.

The current ARMs that address grazing licenses (ARM 36.11.444) specify the following:

1. During renewal inspection, DNRC evaluates the range conditions, plant species composition, levels of riparian forage and browse utilization, levels of streambank disturbance, presence of noxious weeds, erosion, and condition of improvements on each grazing license.
2. During midterm inspections, DNRC evaluates the range conditions, levels of riparian forage and browse utilization, levels of streambank disturbance, and overall tract conditions, emphasizing any problems noted on last inspection.
3. DNRC may require stipulations at any time during the license term.
4. DNRC will specify AUMs, type of livestock, grazing period.
5. DNRC will identify method to specify AUMs.
6. DNRC will design grazing plans to minimize loss of riparian streambank vegetation and to reduce structural damage to streambanks.
7. DNRC will manage licenses to maintain or restore both herbaceous and woody riparian vegetation to a healthy and vigorous condition, facilitate all age classes of riparian community, leave sufficient plant biomass and residue for adequate filter and energy dissipation during floodplain function, and minimize physical damage to streambanks.
8. DNRC will authorize continuous or season-long grazing only if #6 and #7 are met.
9. DNRC shall direct the grazing licensees to place mineral, protein or other supplements in areas that minimize livestock concentration near riparian areas.
10. DNRC will require holding facilities be located outside of riparian areas.

11. DNRC will evaluate existing riparian use during renewal or mid-term inspections and specify acceptable conditions to be met for #6.

12. DNRC will offer technical assistance to mitigate or rehabilitate riparian impacts. If improvements do resolve damages, then DNRC may revise the license. The licensee is primarily responsible for grazing mitigations.

13. The licensee shall be responsible for mitigating problems. DNRC may offer technical assistance or financial assistance.

5.3 PROPOSED CONSERVATION STRATEGY, MONITORING AND ADOPTIVE MANAGEMENT FOR GRAZING

1. DNRC will use existing forest management grazing rules (ARM 36.11.444) as the basis of the proposed HCP grazing conservation strategy. The conservation strategy will adopt and apply the concepts contained in the grazing rules, such as minimizing loss of riparian vegetation, minimizing physical damage to streambanks, maintaining channel stability and channel morphological characteristics, and promoting diverse and healthy riparian plant communities.

2. DNRC will review all grazing licenses on a 5-year cycle with both license renewal and mid-term inspections using the Supplemental Grazing Evaluation Form and Methodologies (see Appendix B) as a coarse filter to evaluate range, riparian, and streambank conditions and presence and extent of noxious weeds.

3. DNRC will use both numerical and narrative criteria in a coarse filter approach to identify potential problem areas. Proposed numerical criteria are:

   a) Riparian Forage Utilization – 50 percent for season-long grazing,

   b) Riparian Browse Utilization – up to 25 percent shrubs in the heavy or moderate browse form class, and

   c) Streambank Disturbance – 10 percent.

   These parameters and methods used for their field assessment are described in Appendix B – Instructions for DNRC Supplemental Grazing Evaluation Form.

4. DNRC will retain the narrative criteria contained in the existing grazing management ARM. DNRC will continue to assess these parameters with methodologies used in the Supplemental Grazing Evaluation Form. Criteria to be evaluated include:

   a) woody shrubs/deciduous trees age class distribution,

   b) presence and extent of noxious weeds,

   c) condition of improvements, and

   d) other problems (such as erosion).

5. DNRC will include in their grazing evaluations an assessment of the following riparian parameters:

   a) A qualitative assessment of grazing impacts on coniferous tree regeneration and tree seedlings will be added to the inspection process, with observations recorded on the Supplemental Grazing Evaluation Form.

   b) The presence and extent of other invasive nonnative plant species that are considered a major threat to riparian or aquatic plant communities and are not currently listed as noxious weeds by the State of Montana will also be evaluated and noted on the DNRC Noxious Weed Inventory/Management Form. DNRC will develop and maintain a list of these species and provide field evaluators an identification guide for field identification. This will include

species listed on county weed districts' watch lists. Appendix B contains a list of species currently on county watch lists.

6. DNRC will complete noxious weed evaluations during both license renewal and mid-term grazing evaluations. DNRC currently uses an existing Noxious Weed Inventory/Management Form (see Appendix B). This form may be revised in the future; however, the information collected under a revised form will be comparable to the type of data and level of detail provided by the current form.

7. DNRC will annually compile the data contained in each Supplemental Grazing Evaluation Form completed for all grazing licenses affecting streams supporting bull trout, westslope cutthroat trout and Columbia redband trout. Results from these evaluations will be used to assess the conditions of HCP affected riparian areas and as a coarse filter to identify potential problem sites.

8. DNRC will complete field verification of potential problem sites within 1 year of receiving the results of coarse filter evaluations. Potential problems will be identified when coarse filter results indicate levels of livestock use and/or impacts above specified numerical and narrative criteria. The objectives of field verification include the following:
   a) Verify the accuracy of field data collected in the Supplemental Grazing Evaluation.
   b) Determine the applicability of criteria to site-specific conditions.
   c) Determine whether criteria actually represent acceptable levels of livestock use.
   d) Verify and document whether unacceptable levels of impact are occurring within the riparian area.
   e) Determine if terms and conditions of licenses are being followed.
   f) Provide an opportunity to involve the licensee in the field assessment.
   g) Involve DNRC water resource specialist or fisheries biologist in the field assessment as necessary.
   h) Allow for the collection of any additional information that may be necessary to prioritize problems.
   i) Develop a general approach, specific solution and/or alternatives to resolve issues.

9. When the verification process determines that no corrective action is necessary, the rationale used to make that determination will be documented by DNRC and discussed at the annual update.

10. DNRC will prioritize sites with verified problems that are in need of corrective action. Priority will be established using the following approach:
    a) Sites with severe problems resulting in highly degraded conditions and problems affecting bull trout core habitat will receive the highest priority. These sites will be addressed before livestock are allowed to use the parcel the next grazing season.
    b) Sites with problems affecting bull trout nodal habitat, westslope cutthroat trout priority management areas, Columbia redband trout habitat, and 303(d) streams supporting covered fish species (scheduled for TMDL development) will receive the second highest priority. DNRC will also attempt to address these sites before livestock turnout the following year. However, if higher-priority sites (as described in item (a)) were being addressed, then DNRC will, at a minimum, address these second-priority sites within 1 year of verification.
    c) Sites with problems affecting remaining bull trout and westslope cutthroat trout habitat will have lower priority. Lower priority sites will be addressed within 1 year of verification.

    RATIONALE. DNRC expects that approximately 30 grazing license inspections or mid-term evaluations that affect HCP covered fish species will be completed on an annual basis. Of these, we estimate approximately five sites per year will require verification of potential

problems based on coarse filter results. It is anticipated that one to three of the sites undergoing verification will require follow-up action to implement corrective actions.

Field data collected during renewal or midterm evaluations are typically not available for assessment until late fall of each year. The administrative processing of renewals is completed prior to February of the following year. Therefore, there is a very limited amount of field time available prior to winter weather to conduct verification or planning of corrective actions. Due to these limitations, it is logical to prioritize which sites will be addressed first based on the present species' legal status and the severity of the problem. With this in mind, DNRC has agreed to address sites with listed species before turnout the next grazing season. The remaining situations will be addressed within 1 year. This is a reasonable prioritization schedule given the limited staff and short timeframes available.

11. DNRC will develop and document site-specific corrective actions for addressing verified grazing problems using the following mechanisms, as appropriate:
    a) Most cases are likely to simply require enforcement or compliance with existing license terms and conditions.
    b) Other cases may require a change in the grazing license, such as a change in carrying capacity, season of use, or installation of improvements. Examples include, but are not limited to fencing, weed control, grazing exclosures, riparian pastures, and off-site watering. Additional examples can be found in Ehrhart (1997, 1998) and USDA (2003). Under ARM 36.11.444 (3), DNRC may specify grazing stipulations at any time during the term of the license.
    c) More complex issues or severe impacts that are not readily addressed by items (a) and (b) will require the development of grazing management plans.
    d) The licensee shall be responsible for mitigation, rehabilitation, and/or the development of a grazing management plan. Technical assistance may be provided by DNRC, NRCS, or another appropriate entity.
    e) Cancellation of a license will be reserved for the most extreme situations where no other solutions are feasible, or the licensee is uncooperative, or all other feasible alternatives have failed.
    f) A grazing management plan will be developed in coordination with the applicable county weed district in situations where invasive nonnative plant species not currently listed as noxious weeds by the state are found and determined to be a major threat to riparian or aquatic plant communities.
12. DNRC will complete implementation evaluations on sites where corrective actions are implemented. These evaluations will occur within 1 year of development and implementation of corrective actions. Implementation evaluations will be completed with the following objectives:
    a) Verify implementation of improvements, changes in grazing license, other changes in grazing management, or compliance with existing terms of the license.
    b) Determine the effectiveness of improvements, newly implemented practices, and/or a new grazing strategy.
13. If improvements or changes to grazing management are determined to be ineffective in correcting problems, DNRC shall (1) adjust the license to facilitate progress toward meeting the corrective action objectives, and (2) continue annual effectiveness monitoring until improvements are verified to be effective.
14. DNRC will develop and complete formal training on the implementation of the proposed conservation strategy for all DNRC field staff involved in the administration of grazing licenses.

15. DNRC will provide grazing licensees with informal training opportunities and education outreach materials, such as pamphlets and brochures, designed to provide information regarding the HCP, riparian conservation objectives, and grazing management conservation commitments contained in the HCP.

16. At the annual HCP review meetings, DNRC will update USFWS on the status of coarse filter grazing evaluations, problem verifications completed, and corrective actions implemented.

17. DNRC will provide USFWS with more detailed information in a comprehensive monitoring report during the 5-year reviews. This report will include results of coarse filter evaluations and documentation on the implementation and effectiveness of corrective actions.

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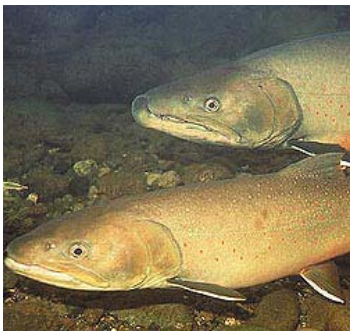

Section 6
Cumulative Watershed Effects Conservation Strategy

6. CUMULATIVE WATERSHED EFFECTS CONSERVATION STRATEGY

6.1 CONSERVATION STRATEGY BACKGROUND AND RATIONALE

Cumulative effects are the collective impacts on the human environment of a proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type (MCA 75-1-220). The cumulative watershed effects conservation strategy and its underlying conservation commitments were designed to minimize or eliminate those collective aquatic impacts that specifically affect watershed resource features, including water yield, flow regimes, channel stability, and in-stream and upland sedimentation due to surface erosion and mass wasting.

The proposed cumulative watershed effects conservation strategy incorporates conservation commitments for the implementation of a screening process, whereby cumulative watershed effects from HCP covered activities will be identified prior to the occurrence of an activity. This will allow DNRC time and opportunity to implement management mitigations and/or develop project alternatives that will eliminate or minimize potential cumulative watershed effects to HCP covered fish species or their habitat.

The cumulative watershed effects screening process is well suited for application to HCP covered activities and incorporates site-specific, scientifically defensible thresholds. The screening process directly addresses existing watershed conditions and assesses project risk to specific habitat elements, including temperature, sedimentation, and habitat complexity. The strategy is expected to meet or partially meet Montana DNRC HCP management objectives for temperature; sedimentation; habitat capacity; and channel form, function, and stability as described further below.

6.2 EXISTING DNRC CONSERVATION STRATEGY

Analyzing cumulative watershed effects is not a new idea, and the concept has been part of the management philosophy of forested state trust lands since the early 1980s. The methods and extent to which cumulative watershed effects were evaluated by DNRC have changed as new technologies were developed. The existing framework with which cumulative watershed effects have been assessed on forested state trust lands has continually undergone public and scientific scrutiny.

Cumulative effects are the collective impacts on the human environment of a proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type (MCA 75-1-220). Future actions include state-sponsored actions that are under concurrent consideration by any State agency through environmental analysis or permit processing procedures. Cumulative watershed effects are those collective impacts specifically affecting watershed resource features, including water yield, flow regimes, channel stability, and in-stream and upland sedimentation due to surface erosion and mass wasting. With respect to forested state trust lands, cumulative watershed effects are exceedingly difficult to measure since the actions affecting watershed resources occur across multiple land ownerships, are temporally and spatially complex, and are typically problematic to accurately inventory and evaluate.

There are three existing conservation strategies that provide DNRC some level of management direction for assessing cumulative watershed effects to bull trout, westslope cutthroat trout, and Columbia redband trout habitat:

- ARM – 36.11.423,
- Montana Environmental Policy Act (MEPA) –MCA 75-1-101 through 75-1-220, and
- Montana Cumulative Watershed Effects Cooperative MOU (June 1993).

The ARMs, and specifically Rule 36.11.423, require DNRC to conduct an assessment of cumulative watershed effects when substantial vegetation removal or ground disturbance is anticipated as a result of proposed actions on forested state trust lands. MEPA requires DNRC to conduct an assessment of cumulative effects as part of a review of potential impacts to the human environment. And as a signatory to the Montana Cumulative Watershed Effects Cooperative MOU, DNRC has agreed to complete and share analyses and data necessary to conduct cumulative watershed effects assessments with other cooperators. These existing conservation strategies are indirectly tied to one another, and each provides some level of guidance in assessing the potential cumulative watershed effects as a result of a proposed action. However, due to generally high levels of environmental variability and different interpretations of environmental risk, the existing strategies have intentionally not identified a set of standards or thresholds that define levels of potential impact.

6.3 PROPOSED CONSERVATION STRATEGY FOR CUMULATIVE WATERSHED EFFECTS

The proposed conservation strategy for cumulative watershed effects is a framework that essentially expands and clarifies the existing ARM for the management of forested state trust lands: MCA 36.11.423, Watershed Management – Cumulative Effects. Consequently, the majority of the content within this conservation strategy is largely a clarification of the ARM.

RATIONALE. The existing administrative rules provide the best framework for assessing the highly variable conditions that may contribute to cumulative watershed effects in both scattered and blocked forested state trust lands. The framework is specifically designed to evaluate past, present, and future conditions that are unique to the different physiographic regions of Montana. The framework also supports the flexibility to use the most appropriate analysis tools and methods for different sites, watersheds, regions, and conditions. The existing administrative rules and framework therefore do not limit DNRC to preset models, methodologies, or fixed thresholds for the assessment of potential cumulative watershed effects related to future actions on forested state trust lands.

CUMULATIVE WATERSHED EFFECTS ASSESSMENT FRAMEWORK

A. APPLICATION – The cumulative watershed effects conservation strategy applies to proposed actions within the watershed boundary containing (1) the headwater streams to drainage(s) up to a maximum of the sixth-order HUC designation and (2) one or more HCP covered fish species.

B. PROJECT and TYPE – DNRC will analyze cumulative watershed effects on all forest management projects (including projects that are categorically excluded from MEPA analysis) involving (1) upland timber and salvage harvest of more than 15 acres or 50 MBF, (2) RMZ harvest of green timber, or (3) salvage harvest within the RMZ of 1 or more acres of dead and dying timber. Watershed resource specialists will complete cumulative watershed effects assessments. Using the analysis, DNRC will ensure that a proposed forest management project will not increase impacts beyond the physical limits imposed by the stream system for supporting its most restrictive beneficial use(s), when considered with other existing and proposed state activities for which the scoping process has been initiated. The analysis will identify specific measures, where appropriate, for mitigating adverse effects on beneficial water uses.

- RMZ harvest refers to harvest within the SMZ, the RMZ as defined by the Riparian Harvest Conservation Strategy, or the CMZ as defined by the Riparian Harvest Conservation Strategy.
- Physical limits generally refers to streambank stability, sediment yield, streambed stability, channel processes, etc.

- Restrictive beneficial uses are those uses of a water body that are classified by Montana Department of Environmental Quality (MDEQ) in established water quality standards. Two examples of beneficial uses are the support of cold-water fisheries and drinking water.

C. METHODS – DNRC will determine the necessary level of cumulative watershed effects analysis on a project-level basis, and, at a minimum will complete a coarse filter (Level 1) analysis (see Appendix C – Coarse Filter Analysis Form (version 2004)). The level of analysis will depend on:

1. Extent of the proposed activity - The extent of the proposed activity will be determined through evaluation of the magnitude, range or geographic scope of the proposed activity. Extent would also consider the degree or level of intensity of the proposed activity. For example, regeneration harvest would be considered a high intensity activity, and salvage harvest of individual dead trees would be considered a low intensity activity.
2. Level of past activities - Levels of past activities will be determined through the Level 1 analysis and then integrated into further analysis, if necessary.
3. Beneficial uses at risk - Beneficial uses at risk are those beneficial uses that are considered to be impaired relative to established water quality standards.

DNRC will use these three factors during the Level 1 analysis to determine the risk of existing cumulative watershed effects or the potential for cumulative watershed effects to result from a proposed DNRC forest management activity. If a Level 1 analysis determines that there is only a low potential for adverse cumulative impacts, then that will be the extent of the analysis. Low potential for impacts implies that there is a low likelihood that adverse cumulative watershed effects of a proposed DNRC action can be detected and foreseen by DNRC. If there is a moderate to high potential for adverse cumulative watershed effects to result from the proposed DNRC forest management activity as determined by a Level 1 analysis, then a Level 2 or Level 3 analysis will be conducted.

D. LEVEL 1 Analysis – The coarse filter (Level 1) analysis is a preliminary analysis that will be applied on all eligible projects. The Level 1 analysis will rely primarily on existing data and information, and will include documentation of rationale describing those variables that may contribute to cumulative watershed effects, an assessment of risk of adverse cumulative watershed effects, and a description of future detailed analysis, if required.

E. LEVEL 2 Analysis – DNRC will complete a more detailed Level 2 and/or Level 3 watershed analysis on projects where DNRC determines through the Level 1 analysis that there is greater than a low potential for cumulative watershed effects.

A Low potential for cumulative watershed effects implies that there is a low likelihood that adverse cumulative watershed effects of a proposed action can be detected and foreseen by DNRC when considering past and present activities on all ownerships. Future actions are also considered when they are state-sponsored actions that are under concurrent consideration by any state agency through environmental analysis or permit processing procedures.

Level 2 watershed analysis generally includes four steps:

1. evaluation of Level 1 analysis results,
2. field review of the project area by a DNRC watershed resource specialist,

3. evaluation of existing direct and indirect effects to watershed resources within the project area to establish a baseline of existing conditions, and

4. qualitative assessment by DNRC of both the coarse filter analysis data and collective projected direct and indirect effects of the proposed action relative to the baseline of existing conditions.

Examples of current Level 2 watershed analysis methodologies that could be used by DNRC include the MEPA Environmental Assessment Checklist (DNRC 1998), Pfankuch channel stability rating (USFS 1974), Lassen National Forest Method (Young 1989), and A Framework for Analyzing the Hydrologic Condition of Watersheds (McCammom et al. 1998).

F. DNRC will complete a detailed Level 3 watershed analysis when the Level 1 or Level 2 analysis predicts or indicates the existence of or potential for unacceptable cumulative watershed effects as a result of the proposed forest management activity.

- A Level 3 watershed analysis uses appropriate levels of information and technology in a quantitative assessment by DNRC of both (1) the Level 1 and Level 2 analysis data, and (2) the collective projected direct and indirect effects of the proposed action relative to the baseline of existing conditions. Examples of current Level 3 watershed analysis methodologies that could be used by DNRC include water yield increases relative to equivalent clearcut areas (USFS 1974), Washington Forest Practice Board (WFPB) Standard Methodology for Conducting Watershed Analysis (WFPB 2002), Forest Practices Cumulative Watershed Effects Process for Idaho (IDL 2000), An Approach to Water Resources Evaluation of Non-Point Silvicultural Sources (USDA 1980), and WATSED (USDA 1992).

- Unacceptable cumulative watershed effects implies that there is a high degree of risk that an adverse cumulative watershed effect of an action can be foreseen and detected by DNRC when considering past and present activities on all ownerships. Future actions are also considered when they are state-sponsored actions that are under concurrent consideration by any state agency through environmental analysis or permit processing procedures.

G. DNRC will establish thresholds for cumulative watershed effects on a watershed-level basis when completing all Level 2 or Level 3 analyses. Thresholds will take into account items such as (1) stream channel stability, (2) beneficial water uses, and (3) existing watershed conditions. The thresholds established for any analysis will be based on the ranges of environmental variability found to be naturally occurring within the watershed(s) encompassing the project area.

- Thresholds are either qualitative (including narrative descriptions) or quantitative standards used to describe acceptable levels of risk of cumulative watershed effects. For example, thresholds for a Level 2 analysis may be low, moderate, and high, while thresholds for a Level 3 analysis may be 5 percent, 10 percent, and 15 percent.

- A watershed-level basis is specific to the watershed boundary containing the headwater streams to the drainage(s) within the project area up to a maximum of the sixth-order HUC designation.

- Stream channel stability describes the ability of a given stream reach or network to facilitate the movement of relatively equal quantities of incoming and outgoing

sediment classes. Stream channel stability also describes the ability of a given stream reach or network to facilitate a range of flow regimes without increased rates of in-stream erosion, migration, or flooding beyond those that would otherwise be expected to occur.

- Existing watershed conditions include variables such as forest cover, road construction, road conditions, flow regimes, natural disturbance, geology, susceptibility to erosion, and other concurrent management proposals.

RATIONALE. Due to high levels of environmental variability and the unique character and circumstances associated with each project area and watershed, the proposed cumulative watershed effects conservation strategy has intentionally not identified a broad set of standards or thresholds that define levels of potential impact or environmental risk. DNRC utilizes general indices as indicators of the potential for cumulative watershed impacts during the Level 1(coarse filter) analysis process. More specific thresholds and acceptable levels of risk are best developed, described and implemented at the project- or watershed-level where specific proposals can be evaluated in conjunction with site-specific watershed values, issues, characteristics and conditions.

H. DNRC will set thresholds at a level that ensures compliance with water quality standards and protection of beneficial water uses, including HCP covered species habitat, with a low to moderate degree of risk.

- Water quality standards are established by MDEQ: MCA 17.30.641, Water Quality – Surface Water Quality Standards and Procedures.

I. In watersheds of water-quality-limited water bodies, DNRC will set thresholds at a level that provides a low degree of risk to beneficial water uses.

- A watershed of a water-quality-limited water body is analogous with the sixth-order HUC watershed contributing to a 303(d) listed water body. A water body identified on a current 303(d) list is determined by MDEQ to have impaired water quality for one or more reasons. The MDEQ maintains 303(d) listings through an interagency agreement with the U.S. Environmental Protection Agency (USEPA), the entity responsible for implementation of the Clean Water Act.

RATIONALE. The proposed cumulative watershed effects conservation strategy is applicable to those forested state trust lands within sixth-order HUC watersheds providing habitat for one or more HCP covered fish species. GIS information indicates there are approximately 461,427 acres of forested state trust lands west of the continental divide within sixth-order HUC watersheds that provide habitat for one or more HCP covered fish species. GIS information also indicates there are approximately 299,407 acres of forested state trust lands west of the continental divide within sixth-order HUC watersheds that (1) provide habitat for one or more HCP covered fish species and (2) include 303(d) listed water bodies. ARM 36.11.423(1)(g) states that the maximum allowable risk of cumulative watershed effects is 'low' in 303(d) listed water bodies. In respect to those forested state trust lands west of the continental divide that fall under the proposed cumulative watershed effects conservation strategy, the existing management prescription currently limits the risk of cumulative watershed effects to 'low' on 65 percent of those parcels providing habitat for one or more HCP covered fish species. This percentage is expected to decrease over time as water bodies are removed from the state 303(d) lists.

J. Whenever feasible, DNRC will cooperate with other landowners in watersheds with mixed ownership to minimize cumulative watershed effects within acceptable levels of risk.

The term "whenever feasible" implies that cooperation with other landowners in a watershed to minimize cumulative watershed effects will occur (1) within DNRC time, financial, and logistical constraints and (2) through the willingness of other landowners to cooperate in such efforts.

K. DNRC will implement management mitigations or project alternatives to offset potential impacts when a high risk of cumulative watershed effects is apparent after Level 2 or Level 3 analysis. Management mitigations will be designed to reduce the potential for cumulative watershed effects to a moderate or low level.

L. DNRC will consider implementing management mitigation or project alternatives when a moderate risk of cumulative watershed effects is apparent after Level 2 or Level 3 analysis.

M. For projects with high or moderate risk of cumulative watershed effects, DNRC will provide documentation that states which mitigations or alternatives were considered and/or selected for implementation.

6.4 PROPOSED MONITORING AND ADAPTIVE MANAGEMENT

Cumulative watershed effects are the result of the collective effects of two or more independent management variables within a watershed. As such, specific cumulative watershed effects are extremely difficult, if not impossible, to differentiate and measure. DNRC does not have the logistical, research, or financial resources to measure potential cumulative watershed effects. However, DNRC is committed to monitoring the effectiveness of all other aquatic conservation strategies in the HCP, which will closely monitor independent variables such as large woody debris, sediment, fisheries connectivity, and stream temperature.

DNRC will conduct the following implementation monitoring as part of the cumulative watershed effects conservation strategy:

A. Based on the scale and scope of the proposed activity, DNRC will review and use appropriate levels of information and technology as described in the cumulative effects conservation strategy for conducting Level 1, Level 2, and Level 3 analyses.

RATIONALE. This commitment will ensure that risk assessments, project mitigation development, and action decisions are founded and consistent with the appropriate levels of information and technology.

B. The Forest Management Bureau will provide watershed resource specialists with training and guidance in conducting Level 1, Level 2, and Level 3 analyses. Associated training will be conducted on an annual basis, and guidance will be an ongoing process.

RATIONALE. This commitment will provide a feedback mechanism to ensure that appropriate methods are used for cumulative watershed effects assessments.

C. Level 1, Level 2, and Level 3 analyses will be reviewed and compiled by the Forest Management Bureau for completeness and consistency.

RATIONALE. This commitment will ensure a high level of analysis oversight and internal strategy implementation monitoring.

D. DNRC will provide USFWS copies of any Level 1, Level 2, or Level 3 analyses upon request. DNRC will also allow USFWS to observe the cumulative watershed effects analysis process when logistically feasible.

RATIONALE. This commitment will ensure that USFWS retains confidence in the implementation of this conservation strategy.

E. DNRC will provide USFWS with updates on all cumulative watershed effects conservation strategy implementation activities, and issues at the annual update and 5-year monitoring meetings (details to be provided in the Itemized Monitoring Table, which is currently being formulated and will be included in the Draft HCP). Annual updates will consist of a list of cumulative watershed effects implementation activities that includes the number, type and location of cumulative watershed effects analysis completed. Every 5-years the USFWS and DNRC will meet to evaluate the effectiveness of the cumulative watershed effects process.

RATIONALE. This commitment will ensure that the overall goals and objectives of the HCP, as they relate to this strategy, will continue to be met. The 5-year review meeting will serve as a coordination effort to ensure that DNRC is providing adequate levels of mitigation for cumulative watershed effects.

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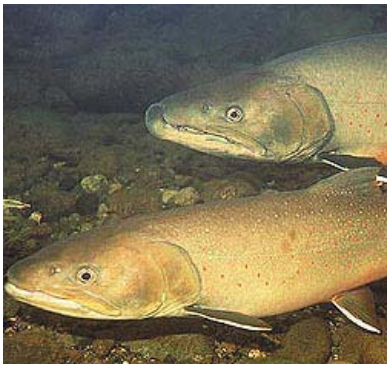


Section 7
Glossary

7. GLOSSARY

124 permit – A permit required under the Montana Stream Protection Act for any project that requires the construction of new facilities or the modification, operation, and maintenance of an existing facility that may affect the natural existing shape and form of any stream or its banks or tributaries. Montana Fish, Wildlife, and Parks (MFWP) issues and administers the 124 permit under the regulatory authority of the Montana Stream Protection Act. The Act states that fisheries resources are to be protected and preserved in their natural state except as may be necessary and appropriate after considering all factors involved. The 124 permit process ensures that plans to modify fisheries resources (e.g. stream channel, stream banks, etc.) either eliminate or diminish potential adverse effects to those fisheries resources.

303(d) listings – Section 303(d) of the federal Clean Water Act (CWA) requires states to assess the condition of their waters to determine where water quality is impaired (does not fully meet standards) or threatened (is likely to violate standards in the near future). The result of this review is the 303(d) list, which must be submitted by each state to the U.S. Environmental Protection Agency (USEPA) every other year. The 303(d) list in Montana is administered by the Montana Department of Environmental Quality (MDEQ).

Animal unit (AU) – An animal unit is one mature cow of approximately 1,000 pounds and a calf up to weaning, usually 6 months of age, or their equivalent.

Animal unit month (AUM) – The amount of forage required by an animal unit for one month.

Bankfull depth – The depth of water in a stream as measured from the surface to the channel bottom when the water surface is even with the top of the streambank.

Bankfull flows – The bankfull flow stage corresponds to the discharge at which channel maintenance is the most effective, that is, the discharge at which moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing work that results in the average morphologic characteristics of channels.

Best Management Practices (BMPs) – A practice or combination of land use management practices that are used to achieve sediment control and protect and protect soil productivity and prevent or reduce non-point pollution to a level compatible with water quality goals. The practices must be technically and economically feasible and socially acceptable.

Best Management Practice Audit – An established monitoring and reporting process conducted both internally by DNRC (Internal BMP Audits) and by third parties (Statewide BMP Audits) to evaluate and document the implementation and effectiveness of BMPs applied on individual DNRC timber harvesting operations and associated site preparation, slash disposal, road construction and road maintenance activities.

Board foot – A unit for measuring wood volumes. It is commonly used to express the amount of wood in a tree, sawlog, or individual piece of lumber. One board foot is a piece of wood one foot long, one foot wide, and one inch thick (144 cubic inches). A thousand board feet is abbreviated MBF.

Bottomless arch culvert – A three-sided culvert that allows a natural streambed in order to achieve substrate and streamflow conditions similar to undisturbed channel conditions.

Box culvert – A concrete (pre-cast or cast-in-place) or metal rectangular culvert, which can be countersunk in the streambed to provide substrate that emulates natural conditions.

Broadcast burning – A controlled burn, where the fire is intentionally ignited and allowed to proceed over a designated area within well-defined boundaries for the reduction of fuel hazard after logging or for site preparation before planting. Also called slash burning.

Browse – (noun) That part of leaf and twig growth of shrubs, woody vines, and trees available for animal consumption.

Bull trout core habitat – Bull trout core habitat is a designation developed by the MBTRT during preparation of the Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin Montana (MBTRT 2000). Core habitat areas are watersheds (including tributary drainages and adjoining uplands) used by migratory bull trout for spawning and early rearing and by resident bull trout for all life history requirements. Core areas typically support the strongest remaining bull trout populations of spawning and early rearing habitat within a restoration/conservation area (RCA) and occur usually in relatively undisturbed watersheds. Twelve RCAs were established in Montana and delineated by the Montana Bull Trout Scientific Group. RCAs have been delineated largely because of fragmentation of historically connected stream systems used by bull trout. These RCAs essentially function as smaller, individual bull trout metapopulations. See MBTRT (2000) for additional information.

Bull trout nodal habitat – Bull trout nodal habitat is a designation developed by the MBTRT during preparation of the Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin (MBTRT 2000). Nodal habitats are those used by sub-adult and adult bull trout as migratory corridors, rearing areas, and overwintering areas and for other critical life history requirements.

Carrying capacity – The maximum livestock stocking rate possible without inducing permanent or long-term damage to vegetation or related resources. The stocking rate may vary from year to year in the same area as a result of fluctuating forage production.

Channel migration zone (CMZ) – Dynamic physical processes of rivers can cause channels in some areas to move laterally (migrate), over time. The area within which a river channel is likely to move over a period of time is referred to as the channel migration zone. Channel migration can occur gradually, as a river erodes its banks and deposits sediment along the other or abruptly, as the river channel shifts (avulses) to a new location.

Connectivity – Connectivity is the capability of different life stages (e.g. adult or juvenile fish) of HCP fish species to move among the accessible habitats within normally occupied stream segments. For example, a culvert or dam may reduce connectivity by preventing or impeding upstream or downstream migration. For this HCP, the objective for connectivity will focus exclusively on road-stream crossings.

Disturbance regime – A *disturbance regime* for an area comprises all of the various disturbances that may occur. There typically would be several types of disturbances, each characterized in terms of its type, size, spatial distribution, frequency, magnitude, and other spatial and temporal characteristics.

Engineered substrate – Stream bottom material, such as gravel and cobbles, mechanically placed within a stream channel or culvert to emulate the natural conditions upstream or downstream.

Fishery – An area of water where fish are caught for recreational or commercial purposes.

Forage – (noun) All browse and herbage that is available and acceptable to grazing animals or that may be harvested for feeding purposes.

Ford – A dip constructed in the roadbed at a stream crossing, instead of a culvert or bridge. The streambed should be of erosion-resistant material, or such material must be placed in contact with the streambed.

Forested state trust lands – Forested state lands managed by the Trust Land Management Division of DNRC for the economic benefit of the common schools and endowed institutions of Montana.

Appendix A

SUPPORTING INFORMATION AND FORMS FOR THE SEDIMENT DELIVERY REDUCTION CONSERVATION STRATEGY

Examples of DNRC Contract Standards and Specifications for the Implementation of Site-Specific BMPs

(not yet complete – will include samples of DNRC timber sale resource protection contract language)

DNRC ROAD INVENTORY PROCEDURES

1.Purpose

1. Conduct field inventories to determine the status, location and condition of all existing roads occurring on State trust lands and designated shared use roads within each of the watershed project areas. Data collected will be recorded on DNRC Road Inventory Field Forms using methods outlined in Section IV (Technical Specifications) or on a Contract Supervisor approved substitute form using methods and procedures proposed by the bidder.

2. Inventory and evaluate the conditions of all stream and other drainage feature crossing structures which occur on State trust lands and designated shared use road within each watershed project area. Data collected will be recorded on a DNRC Stream/Drainage Feature Crossing Inventory Form using methods outlined in Section IV (Technical Specifications) or on a Contract Supervisor approved substitute forms using methods and procedures proposed by the bidder.

3. Delineate the location of each inventoried road segment, crossing structure and stream reach on a project area reference map.

4. Produce a Road Inventory Summary Report for each project area. This report shall summarize road conditions, and identify concerns and opportunities for restoration activities in each project area.

II. **TECHNICAL SPECIFICATIONS**

1. Verify location and status of all existing roads which occur on State Trust parcels (DNRC parcels) within each watershed inventory project area. Use base maps provided by DNRC to determine the location of DNRC parcels included in project area. Update base maps to indicate actual road locations and road status if it differs from those on base maps.

   a. The following classification will be used to characterize road status:

      1)Open
      2)Gated
      3)Closed-other (concrete barrier, guard rail closure)
      4)Closed-bermed
      5)Abandoned/brushed-in
      6)Reclaimed

2. Map additional roads located within or adjacent to the DNRC parcel which are not delineated on the existing base maps. Adjacent roads are defined as those roads that are in physical contact with the DNRC parcels ownership boundary on the ground.

3. All roads located within DNRC parcels shall be inventoried and evaluated using a DNRC Road Inventory field form or Contract Supervisor approved substitutes provided by the bidder.

Roads to be inventoried are to be divided into individual road segments for evaluation. Roads will be divided into segments at intersections, road junctions, or whenever road engineering standards and/or overall conditions change. A road should also be split into segments when there are substantial changes in the landscape that the road is located on such as: soils or geologic parent materials, slope position, steepness of side slopes, road grade or other topographic features. Each road segment is evaluated and summarized as a separate entry on the Road Inventory Field Form or approved substitute form.

Some abandoned or older low standard roads may be difficult to locate and evaluate due to topography, re-vegetation, or lack of discernable road prism. The Contract Supervisor will take these conditions into consideration when apply this standard. Gross error will always be penalized.

4. The maximum road length to be delineated and evaluated as an individual road reach is 1 mile (5280 feet). The minimum road length to be delineated and evaluated as an individual road segment shall be 1/10 of a mile (528 feet) with the exception of stream and drainage feature crossings. Crossing structures and associated road approaches shall be delineated and evaluated as an individual road segment even if it involves less than 1/10 mile (528 feet)of linear road distance.

5. Each individual road segment will be evaluated for the following characteristics: road status, road segment length, average road width, presence of road surfacing materials, average cut and fill height, average cut and fill slope, soil type and geologic parent material, slope position, road conditions, and recommendations. These evaluations are to be documented on a copy of the DNRC Road Inventory Field Form or approved substitute. All data fields contained on the form must be completed. These evaluations are to be completed using the following instructions or approved alternative procedures and methods:

   a. Determine the length of each road segment in feet or miles (rounded to the 1/10 mile) by use of measuring tape, hip chain, string machine, odometer, or indirect measurements from map or aerial photography.

   b. Road width shall be determined by measuring the distance from the toe of the cut slope to the top of the fill slope. Average road width shall be determined by estimating the average of several measured widths which are representative of an individual road segment.

c. Presence or absence of road surfacing material shall be noted for each road segment. Surface material shall be classified and noted as being:

1. None - no surfacing;
2. Native - materials with high rock content;
3. Pit run gravel;
4. Crushed gravel; or
5. Asphalt.

d. Estimate average cut slope height for each road segment in feet.

e. Estimate average cut and fill slopes ratios for each road segment. Use conventional run:rise slope ratios.

f. Determine geologic parent material for each road segment. If geologic parent material varies within a road segment already at minimum allowable length, record the more prevalent class occurring within that segment. Classify geologic parent material into one of the following groups:

1. Granitic
2. Metamorphic (gneiss & schist)
3. Metasediment (Belt)
4. Limestone - Dolomite
5. Volcanic
6. Soft/Hard Sediment
7. Tertiary Valley fill
8. Alluvium
9. Lacustrine
10. Glacial Till

g. Classify soil types using Standard NRCS Soil Survey soil series or NRCS detailed map unit names, or by documenting general observations regarding soil depth, texture and rock content.

h. Determine slope position by classifying the general location of each road segment on the landscape. Specify one of the following classes: ridge top, mid-slope, lower slope, bench, valley bottom or streamside management zone (SMZ).

i. Evaluate the condition of each road segment in regards to the presence and extent of surface erosion, fill slope and cut slope vegetation, fill slope or cut slope erosion, existing mass failures, existing or potential sediment delivery to streams, ephemeral drainage features or other water resources.

j. Evaluate the condition of all ditch drainage systems, catch basins and ditch relief structures, and road surface drainage features located within each road segment.

k. List recommended road maintenance needs, road improvements or mitigations measures which address problem identified concerning road or drainage feature conditions.

6. Complete evaluations of all existing stream and drainage feature crossings structures located on DNRC administered trust lands using a DNRC Stream Crossing/Drainage Feature Inventory Form with the following instructions:

   a. Assign a unique identifying code to each crossing structure evaluated. Record crossing code as well as other general data concerning the location of each crossing structure on a DNRC Stream Crossing/Drainage Feature Inventory Form and on a copy of the project area reference map.

   b. Cross reference the location and code of each crossing structure on the corresponding Road Inventory Form covering that road system. Delineate each crossing structure and adjacent road approaches as an individual road segment.

   c. Record stream class determined according to the classification system used under the Montana Streamside Management Zone Law and Rules (77-5-302 MCA). Note those drainage features which are not classified as a stream, lake or other body of water under Montana SMZ Law and Rules.

   d. Record crossing type on Stream Crossing Inventory Form. Crossing types other than culvert and bridge, may include: unimproved fords, improved fords, abandoned or removed crossings, and crossing constructed from native materials.

   e. Summarize stream channel characteristics and conditions at crossing site in space provided under section titled “Other features”.

   f. Document observations concerning crossing size, capacity, function, and condition for each individual crossing on the DNRC Stream/Drainage Feature Crossing Inventory Form. Complete cross section and plan view sketches in diagram boxes provided on form.

   g. Color print photographs are required of all stream crossing structures. Photographs of the structure shall be taken from both the upstream and downstream views of the crossing. Photographs shall be of adequate resolution, contrast, brightness and scale so that the structure and drainage feature are clearly visible.

   h. Complete “Recommendations” section of form by noting any recommended maintenance, improvements or mitigations measures designed to address problem areas. Problem areas include: improper sizing, inadequate capacity, road surface or fill erosion, bank erosion, channel scour, channel instability and fish passage barrier.

7. Verify location and status of all shared-use roads that are identified on each watershed project base map provided by DNRC.

Update maps to indicate actual road locations and actual status if it differs from those on maps.

8. Inventory and evaluate all roads designated as shared-use roads on project area base map using a DNRC Road Inventory Field Forms or Contract Supervisor approved substitutes provided by the bidder. Roads will be inventoried using the same procedures outlined under the instructions for evaluating roads located on DNRC administered lands.

9. Complete evaluations of all existing stream and drainage feature crossings structures located on designated shared use roads on the DNRC Road Inventory Field Form. Note: A DNRC Stream/Drainage Feature Crossing Form is not required for crossing structures located on shared use roads.

   a. Delineate each crossing structure and adjacent road approaches as an individual road segment. Assign a unique identifying code to each crossing structure. Record crossing code as well as other general information concerning the type, size and condition of the crossing structure on the DNRC Road Inventory Field Form.

   b. Record the location of each crossing structure on the corresponding Project Area Reference Map. Label each location with the appropriate identifying code.

III. Watershed Project Area Summary Report Inspection Process

Each Watershed Project Area Summary Report will be inspected by the Contract Supervisor. The report will be checked for accuracy and completeness by comparing the information contained in the report against the technical requirements contained in the contract, data on field forms and the project reference map.

DNRC ROAD INVENTORY FIELD FORM

Project:_____ Watershed:_____ Road Name / Number:_____ Status:

Segment ID	Legal T R Sec	Segment Length	Parent Material	Surface Material	Road Grade	Avg. Width	Avg Cut Height	Cut Slope Ratio	Avg Fill Height	Fill Slope Ratio	Road Segment Description and Condition	Recommendations - Improvements and Mitigation Measures

APPENDIX B

SUPPORTING INFORMATION AND FORMS FOR THE GRAZING CONSERVATION STRATEGY

Summary of DNRC Grazing Licenses on Classified Forest Trust Lands Affected by Bull Trout, Westslope Cutthroat Trout, and Columbia Redband Trout Distributions

	Number of Parcels	Acres	Miles of Stream
HCP covered lands with Grazing Licenses	**454**	**198,907**	**407.0**
HCP covered lands with grazing licenses and one or more HCP fish species present.	**154**	**71,330**	**110.0**
HCP covered lands with grazing licenses and bull trout present	**55**	**25,625**	**41.7**
HCP covered lands with grazing license and westslope cutthroat trout present	**150**	**69,605**	**107.3**
HCP covered lands with grazing license and Columbia redband trout present	**2**	**625**	**0.9**

Note: This is currently being revised by DNRC to reflect the revised Geographic Scope of the DNRC HCP.

GRAZING FIELD EVALUATION FORM

SEC: TWN: RNG: LEASE #: COUNTY:
LEGAL DESCRIP:
: EXPIRES:

COMMERCIAL NAME:
LAST: FIRST: MI:
ADDRESS:
:
CITY: STATE: ZIP:
PHONE:

VALUE - GRAZING: SHARE - AGRICULTURE:
AGRICULTURE:
CRP:

PAST FIELD FINDINGS		PRESENT FIELD FINDINGS	
	TOTAL ACRES		
	AGRICULTURE		TYPE OF CROP(S):
	CRP		SPECIES:
	HAY		SPECIES:
	GRAZING		USE:
	GRAZING UNUSED		
	UNSUITABLE		EXPLANATION:
	OTHER		EXPLANATION:
	AUMs		GRAZE: CROP/HAY AFTERMATH:

RENEWAL LEASE TERM: 10 YR. ___ 5 YR. ___ OTHER: ___YEAR(S)
RESTRICTED GRAZING SEASON: FROM _____ TO

DEVELOPMENTS NOTED: POWERLINE _____ ROAD _____ MISSILE CABLE_____
PHONE CABLE _____ PIPELINE _____ OTHER

_____

_____

MINERAL ACTIVITY:

_____

_____

AREA OFFICE RECOMMENDATION ON LAND USES:

_____

_____

FOLLOWUP ACTION REQUIRED: YES _____ NO _____

MANAGEMENT PLAN: YES _____ NO _____

TYPE:

OTHER ACTION NEEDED:

_____

_____

WHO WAS CONTACTED? _____ PHONE _____ LETTER

_____ PERSONAL_____ LAND USE SPECIALIST: _____

DATE OF APPRAISAL: _____

RANGE EVALUATION

P% = PRESENT; C% = CLIMAX; COMPOSITION % BY WEIGHT

(May be clipped or estimated)

SITE NUMBER ONE			**SITE NUMBER ONE**			**SITE NUMBER ONE**		
RANGE SITE			RANGE SITE			RANGE SITE		
ACRES			ACRES			ACRES		
SPECIES:	P%	C%	SPECIES:	P%	C%	SPECIES:	P%	C%
DECREASERS			DECREASERS			DECREASERS		
INCREASERS			INCREASERS			INCREASERS		
INVADERS			INVADERS			INVADERS		
%COMPOSITION	100%	%	%COMPOSITION	100%	%	%COMPOSITION	100%	%
Cond. Class XXX			XXX			XXX		

SITE NUMBER FOUR			SITE NUMBER FIVE			SITE NUMBER SIX		
RANGE SITE			RANGE SITE			RANGE SITE		
ACRES SPECIES: DECREASERS	P%	C%	ACRES SPECIES: DECREASERS	P%	C%	ACRES SPECIES: DECREASERS	P%	C%
INCREASERS			INCREASERS			INCREASERS		
INVADERS			INVADERS			INVADERS		
%COMPOSITION	100%	%	%COMPOSITION	100%	%	%COMPOSITION	100%	%
Cond. Class XXX			XXX			XXX		

	PRESENT RATING				POTENTIAL RATING			
SITE	ACRES	AUMs/AC	TOTAL AUM		SITE	ACRES	AUMs/AC	TOTAL AUMs
No. 1					No. 1			
No. 2					No. 2			
No. 3					No. 3			
No. 4					No. 4			
No. 5					No. 5			
No. 6					No. 6			
TOTAL ACRES	**TOTAL AUMs**							

SALINITY PROBLEMS/EXISTING OR POTENTIAL: LAND USE _____

LOCATION _____

SURROUNDING LAND USE: ACRES _____

CONTROL METHODS:

NOXIOUS WEEDS:

LOCATION:

CONTROL:

UNTILLED & SUITABLE FOR AGRICULTURE: ACRES _____

LOCATION_____

EROSION PROBLEMS:

RIPARIAN AREA HEALTH:

UTILIZATION: UNUSED SLIGHT MODERATE FULL CLOSE SEVERE EXTREME

0% 0-20% 20-40% 40-50% 50-60% 60-80% 80-100%

TREND: UPWARD _____ DOWNWARD _____ STATIC _____

MANAGEMENT NEEDS ON ANY PART, OR USE, OF THIS TRACT

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION

SUPPLEMENTAL GRAZING EVALUATION FORM
(For Use on Classified Forest Lands)

TWN: RNG: SEC# : LICENSE # : AREA/UNIT:

LEGAL DESCRIPTION:

EXPIRATION DATE: INSPECTION DATE: EVALUATOR:

–

COMMERCIAL NAME:

LAST: FIRST:

ADDRESS:

CITY: STATE: ZIP:

PHONE:

–

CURRENT GRAZING MANAGEMENT:

1) HAS THE PARCEL BEEN GRAZED IN PAST YEAR? YES _____ NO _____

2) # OF LIVESTOCK GRAZING PARCEL:

3) SEASON OF USE (MONTHS):

4) GRAZING SYSTEM:

HAS A MANAGEMENT PLAN BEEN DEVELOPED?
IF YES, DESCRIBE SPECIAL REQUIREMENTS:

DESCRIBE OVERALL TRACT CONDITION (GENERAL DESCRIPTION):

***PREVIOUS CONDITION CLASS:**	***CURRENT CONDITION CLASS:**
*Document previous and current average condition class across all range sites evaluated.	
Excellent (75-100) _____	**Excellent (75-100) _____**
Good (50-75) _____	**Good (50-75) _____**
Fair (25-50) ____	**Fair (25-50) ____**
Poor (0-25) _____	Poor (0-25) _____

RIPARIAN AREAS:

1. STREAM NAME(S): _____

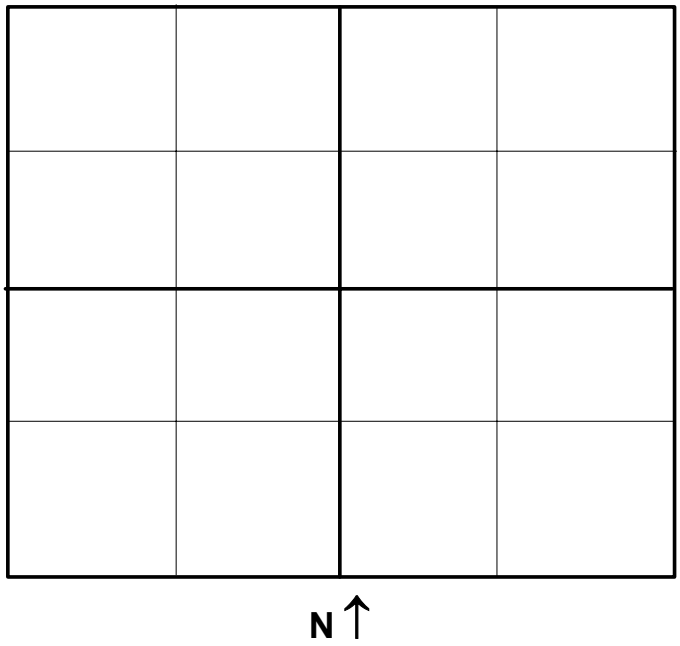
2. STREAM(S) CLASS: NONE_____ CLASS 1_____ CLASS 2_____ CLASS 3_____ LAKE_____ OBW_____

3. OTHER RIPARIAN OR WETLAND (SPECIFY TYPE):

FISHERIES STATUS (UNKNOWN –or– SPECIES PRESENT):

RIPARIAN FIELD EVALUATIONS:

LENGTH OF STREAM/RIPARIAN AREA EVALUATED (Estimate Distance in Feet)
_____



Sketch the location of streams and riparian areas on the tract and delineate the reach evaluated.

STREAMBANK DISTURBANCE: ESTIMATED % _____

RIPARIAN FORAGE UTILIZATION: (CIRCLE ONE)

UNUSED	SLIGHT	MODERATE	FULL	CLOSE	SEVERE	EXTREME
0%	0-20%	20-40%	40-50%	50-60%	60-80%	80-100%

RIPARIAN BROWSE UTILIZATION: (Indicate% of total composition in each utilization class)

__ Woody Species Not Present

__ % None - 0-5% of the available second year and older leaders are browsed.
__ % Light - >5-25% of the available second year and older leaders are browsed.
__ % Moderate - >25 - 50% of the available second year and older leaders are browsed.
__ % Heavy - >50% of the available second year and older leaders are browsed.
__ % Dead - 100% of canopy is dead.
__ % Unavailable - Provides no browse below 1.5 m in height, or unavailable due to location.

Σ Total 100%

RIPARIAN WOODY SPECIES AGE CLASS: (Indicate% of total composition in each age class)

__ Woody Species not present

__ % Seedling - 1 individual stem
__ % Young/ Sapling - 2 to 10 stems
__ % Mature - More than 10 stems
__ % Decadent - > 30% of canopy is dead
__ % Dead - 100 % of canopy is dead

Σ Total 100%

ARE NOXIOUS WEEDS PRESENT? YES _____ NO _____

IF YES, COMPLETE INVENTORY FORM AND NAME THE THREE MOST PREVALENT SPECIES:

OTHER COMMENTS REGARDING OVERALL HEALTH OF RIPARIAN AREA:

RECOMMENDATIONS:

INSTRUCTIONS FOR COMPLETING THE DNRC SUPPLEMENTAL GRAZING EVALUATION FORM ON CLASSIFIED FOREST LANDS

The methods utilized for completing the Supplemental Grazing Evaluation Form are essentially the same for both license renewal and mid-term evaluations. Instructions for completing the supplemental form, including evaluation of riparian forage utilization, riparian browse utilization, riparian shrub age class distribution and streambank disturbance, and all other requested information are contained in the following section:

Location / Licensee

This section of the supplemental form duplicates the information already completed at the top of the existing Field Evaluation Form. It includes a legal description, lease #, expiration date, and name and address of the holder of the grazing license. It is essential to complete this information, despite its duplication, just in case the supplemental form is separated from the DNRC Field Evaluation Form.

Current Grazing Management

This section of the supplemental form is meant to summarize and provide insight into the existing grazing management. Indicate whether or not the parcel has been grazed during the past year. If the parcel has not been grazed in the past year, estimate the last year grazed. Estimate the number of livestock currently grazed on the parcel and allotted season of use. Indicate and describe any specific or unique grazing techniques or systems utilized by the licensee and any special requirements or restrictions that have been placed on the license.

Tract Condition

For renewals, summarize overall tract condition based on the results of the detailed range evaluation completed on page 2 of the DNRC Field Evaluation Form. For mid-term evaluations use an ocular assessment of tract conditions to compare current range condition to the results of the previous detailed range evaluation completed at last renewal inspection. Note if tract condition has improved, deteriorated, or remained unchanged, and document any change in condition class. Inspect any problems noted during previous evaluation, and note the presence and condition of noxious weeds, erosion, water developments, fencing, and salting. If county-listed noxious weeds are noted, complete Weed Inventory Form (located in Weed Management Guidance) as required by Weed Management RMS #12.

Riparian Areas

Indicate presence or absence of riparian areas on parcel being evaluated by checking the appropriate category on form. For streams, use definitions contained in SMZ Law and Rules to determine if a stream channel is present and indicate the class of the stream channel. If more than one stream channel is present in the parcel, indicate the class of each stream evaluated. When inspecting tracts with multiple streams and/or riparian areas evaluate the most sensitive riparian area on the tract (e.g., streams containing fisheries, class 1 streams).

Indicate presence and describe any other riparian or wetland features occurring on the site that do not meet the SMZ Law and Rules definition of a stream channel. Examples include: spring or seeps with no discernable stream channel, ephemeral draws, ponds, potholes or other bodies of water that are less than 1/10 acre in size.

Fisheries Status

Indicate presence or absence of a fishery for all Class 1 streams and other bodies of water supporting known or suspected fish populations. Indicate species present if known. If status is unknown, indicate it as such.

Extent of Riparian Evaluation

In order to complete these evaluations the observer will need to determine the location and extent of riparian area and length of stream channel to be evaluated. If possible and time permits, the entire length of stream and associated riparian area within the parcel should be evaluated. If the stream is too long, then one or more representative segments (areas judged to be most representative of conditions over the entire parcel) will have to be identified and evaluated. The reach should not be located in an isolated area which is more heavily impacted than the remainder of the parcel. Conversely, the evaluator should not focus their efforts in an area that is relatively undisturbed or in "better condition" than the rest of the parcel.

Using the Green Line (the first perennial vegetation above the stable low water line of a stream or water body), a study reach will be determined by pacing 500 feet adjacent to the stream channel. If both sides of the stream reach are in the same grazing license, the evaluation should include the riparian zone on both sides of the stream. Ocular assessments will be made by walking along the Green Line and observing the bank and vegetation that lie within a 6-foot width, 3 feet extended to either side of the evaluator and the Green Line. The Green Line method will be used to perform riparian evaluations for forage utilization, browse utilization, streambank disturbance, and riparian tree and shrub age classes.

Indicate by sketching the location of streams and riparian areas on the tract and delineate the reach evaluated on the Supplemental Grazing Evaluation Form.

Streambank Disturbance

An assessment of stream bank disturbance is to be completed on each tract to determine the level of compliance with Grazing Resource Management Standard #7C. This standard requires that streambank disturbance induced by livestock trampling be limited to less than 10 percent alteration per 500 feet of streambank. The underlying goal of this standard is to protect the integrity of streambanks by maintaining them in a condition that resists erosion.

The amount of damage to streambanks will be determined by ocular assessment. The evaluator will view the stream banks and determine the amount of damage caused by livestock. The evaluator will proceed along the Green Line viewing the banks within the 3-foot extension to either side of the Green Line. The length of each livestock altered segment encountered will be estimated and recorded to a resolution of 1 foot. After evaluating both streambanks (if necessary), the overall percentage of altered bank will be determined by dividing the total length of altered bank by the total Green Line length calculated and recorded on the Supplemental Grazing Evaluation Form.

DNRC recognizes that this evaluation will require a judgment call on the part of the evaluator. The most obvious indicator of livestock induced bank alteration is direct evidence of trampling or a concentration of hoof prints along an unstable streambank, and exposure of bare mineral soil.

On highly sinuous stream channels, bank erosion occurs mostly on the outside of the meander curves. Streambank alteration will be overestimated if the evaluated segment is mostly composed of an outside curve. Conversely, streambank alteration may be underestimated if the evaluator focuses on the inside of a meander bend. To ensure accurate estimates, use two full meander cycles as the minimum length of representative segments. A complete meander cycle has the same amount of inside and outside curvature.

Riparian Forage Utilization

Utilization is traditionally described as the portion or percent of current-year forage production that is consumed or destroyed by grazing. A problem with this parameter is the difficulty of evaluating or visualizing something that has already been removed (Bauer 1993).

A quick and easy method of estimating riparian forage utilization has been developed using photographic guides for key riparian graminoids (Kinney and Clary 1994). The use of photographic guide is based on the appearance of the residual portion of a grazed plant (see Appendix 2).

The photographic guide provides a visual comparison standard, which should assist in making utilization estimates more consistent and accurate. Estimate riparian forage utilization by comparing the residual stubble of individual plants to the appropriate photo series contained in the guide. If the species being evaluated are not included in the photo guide, use the photo series from the most closely related species or a species with the most similar growth form. Estimates of riparian forage utilization will be based on the growth form of the plant rather than its size. Therefore, variation in height growth due to site characteristic, seasonal precipitation, or other factors will have minimal effect on utilization estimates.

Riparian utilization will be observed along the Green Line in a representative reach. The area evaluated must be large enough to be considered representative of overall tract conditions. Estimate average utilization of riparian forage species at each tract and record this value on the Supplemental Grazing Evaluation Form.

Riparian Browse Utilization

Many riparian woody species are browsed by livestock or wildlife. Heavy utilization can prevent regeneration or establishment of woody species. Excessive use of these species may cause their elimination from the site and replacement by disturbance-induced species or undesirable invaders.
Riparian browse utilization will be evaluated by DNRC using a modified version of the Cole Browse Survey method (BLM 1996 and USFS 1969). This method is well suited for situations where browse data must be obtained from a large area with limited personal and time.

Riparian shrubs will be examined along the Green Line to determine browse form class during both renewal and mid-term evaluations. Sampling should be confined to key species. Key species include willows, dogwood, choke cherry, mountain maple and service berry. Alder and snowberry should only be sampled if other preferred species are not present. Form class assignments are based upon the length and appearance of the previous year's growth (see Table 1 and Appendix 3).

Table 1 - Browse Form Classes

None	0–5% of the available second year and older leaders are browsed.
Light	5–25% of the available second year and older leaders are browsed.
Moderate	25–50% of the available second year and older leaders are browsed.
Heavy	> 50% of the available second year and older leaders are browsed.
Unavailable	Browse species at site provide no browse below 1.5 m height or are unavailable to livestock due to location.

When estimating the extent of utilization, consider browsed second year and older leaders on woody species normally eaten by livestock and/or wildlife. Do not count current year's use since an evaluation in mid-season is not an accurate reflection of actual use. Leader use estimates are confined to the available portions of the plant. Available portions are those that can be easily grazed, i.e., the plant is not overhanging a stream or steep embankment, or crowded up against another plant. For a cow, browse is only available below five feet in height.

More than one degree of hedging within the available portion of the plant is quite common. Therefore, the overall form class of an individual shrub is based on the average condition of the branch ends.
Determine form class by comparing the total number of leaders available (those within animal reach) with the number of leaders browsed. Estimate the percentage of shrubs from the overall shrub community that occur in each browse form class and record this information on the Supplemental Grazing Evaluation Form.

Riparian Tree/ Shrub Age Classes

An evaluation of riparian trees and shrub age class distribution has also been added to the Supplemental Grazing Evaluation Form. The presence of woody plants in all age classes (seedlings, young, and mature) at sites supporting woody species is one of the clearest indicators of riparian health, vigor, and vegetative stability. Regeneration of woody species can be reduced by heavy browsing on young age class woody plants. A high amount of seedling or young age class plants indicates an upward trend in shrub-dominated riparian types.

The age class of woody species occupying the site based on the number of stems on each plant. See Table 2 for a description of identifying characteristics of each age class (Bauer 1993).

Table 2 -Woody Species Age Classes

Age Class	Characteristic
Seedlings	1 Stem
Young/Sapling	2 to 10 Stems
Mature	More than 10 Stems
Decadent	≥ 30% of Canopy Dead
Dead	100% of Canopy Dread

Determine the percentage composition of each age class by visually estimating along the Green Line and recording results on the Supplemental Grazing Evaluation Form. This monitoring parameter is only applicable to those areas with woody species or woody species potential. Indicate an absence of woody species on the tract on the Supplemental Form. For a woody species age class to be considered present, a minimum of ten individuals per age class per acre must be present. The total of all age classes should equal 100 %, unless riparian shrubs or trees are not present on the tract.

Other Comments

This section provides additional space for the evaluator to make general comments regarding overall riparian health or specific observations which have not already been documented in the previous sections. Some examples might be presence of noxious weeds, effects of irrigation diversions, impacts due to channelization from roads, beaver activity, or concentrated use of riparian area by big game.

Recommendations

List recommended actions for those tracts not meeting the prescribed Grazing Management Standards. Recommendations should address measures designed to mitigate or rehabilitate impacts to riparian and water resources. Describe rangeland improvements or changes in the current grazing management necessary to resolve specific problem areas. Rangeland improvements might include riparian management, weed control, off-site water developments, new or alternative grazing systems, fencing, or prescribed burning.

Summary

The prescribed limits of acceptable resource damage are defined by RMS #4, 6, and 7c. Methods for evaluating those criteria have been outlined in this guidance. Failure to meet the prescribed numeric criteria for riparian forage utilization, riparian browse utilization, and streambank disturbance and/or the narrative criteria for maintenance of different age classes of desired riparian-wetland plant communities may require changes in current grazing practices. **Adjustment to grazing license may be necessary to facilitate rehabilitation and ensure compliance with Grazing RMS #4, 6, and 7c.** Changes in grazing management may include, but are not limited to, such measures as: adjustment to initial stocking rates, length of use, grazing seasons, fencing, offsite water developments, implementation of alternative grazing systems or other restrictions. The BLM and the Montana Riparian and Wetland Association have recently published a document titled "Successful Strategies for Grazing Cattle in Riparian Zones." This document (see Appendix 4) will provide an excellent reference for developing techniques and strategies for riparian grazing management.

Coordination

Currently, the Area Land Offices track grazing license renewal inspections and notify individual Units of their requirement to conduct renewal inspections. The Area Land Offices will also track and notify Units of requirements to perform mid-term evaluations. Units will forward results of mid-term and renewal evaluations to the Agriculture & Grazing Bureau, who will in turn forward copies of the Field Evaluation Form and the Supplemental Grazing Evaluation Form to the Forest Management Bureau's forest planner.

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DNRC NOXIOUS WEED INVENTORY / MANAGEMENT FORM

PROJECT_____ UNIT_____ DATE_____

T____, R____, Section_____ Waypoint_____

Leased/Licensed Yes No Is this a follow-up review?_____
_____Are there Weed District Coop. Planned for adjacent lands?_____

Are there any sensitive sites or limitations to treatments that require special mitigation? (Surface water, Adjacent residences, Sensitive plants)_____

Project Map or attach Quad Map 1:24000

SYMBOLS FOR DESIGNATING INFESTED ACRES ON MAP

1. X = Spot infestations, less than 0.1 acre △ **= 0.1 to 1 acre**

□ = 1 to 5 acres ⬭ =Draw in infestation> 5 acres

∪ = Infestations that follow linear features such as roads and streams should be designated by drawing lines on the map.

If Category 2 or 3 Noxious Weeds are found, Notify Area Office & County Weed District

SITE NUMBER	WEED SPECIES	COUNTY PRIORITY	INFEST. SIZE	COVER CLASS	CONTROL OBJECTIVE	TREATMENT SUGGESTED/NOTES

WEEDS IN THE ROAD (F)		**WEEDS IN STAND/MAP UNIT OR DENOTED MAP AREA**	
Record whether or not weeds are growing in any road bd or R/W (includes cut and fill) located in the stand polygon or located adjacent to the polygon. If a road separates to or more stands, record the presence of weeds for the stand that most of the road is adjacent to. You do not have to record the presence of weeds for both stands when they are on each side of the road.		Record whether or not weeds are growing in the stand or map unit polygon	
CODE	**DESCRIPTION**	**CODE**	**DESCRIPTION**
R 0	None; no weeds were observed growing in the road(s) adjacent to or within the polygon.	**0**	None; no weeds were observed growing in the stand polygon or area.
R 1	Spotty; noxious weeds are growing in the road(s) in a few small spots (less than an area 20'x 20').	**1**	**Spot Spotty or occasional plants; noxious weeds are** growing in the stand in a few small spots (less than an area 20'x 20').
R 2	Established patches; noxious weeds are growing in patches in the road(s). Some of the weeds are growing in patches greater than an area 20'x20' in size (400 sq. ft.)	**2**	Mod. Established patches; noxious weeds are growing in patches in the stand. Some of the weeds are growing in patches greater than an area 20'x 20' in size.
R 3	Abundant; noxious weeds are growing throughout most of the road(s) bed and/ or R/W (> 50% of the road area).	**3**	High Abundant; noxious weeds are growing throughout most of the stand (> 50% of the stand area).

INSTRUCTIONS TO FILL OUT NOXIOUS WEED INVENTORY FORM

NOXIOUS WEED INVENTORY/MAPPING
The following are map symbols and cover classes used to outline and describe noxious weed infestations for project specific weed mapping which meet the requirements of the Statewide weed mapping standards required by County Weed Districts (Mapping Noxious Weeds in Montana Ext. PUB. EB 148 & Montguide MT 9613).

STEP I
Fill out the Weed Inventory / management form header with all available information (Legal description, date etc). Outline the survey area on the quad map. Areas inside the survey boundary without size and location designations will be considered weed free.

STEP 2
Designate the noxious weed species and use correct symbol on map (refer to current Montana State listed Category weeds and County Weed District listed weeds, attached).
Map the infested areas using the following symbols to designate the size and locations of the infestations (symbols should be centered over the infestation sites).

SYMBOLS FOR DESIGNATING INFESTED ACRES ON MAP

X = POINT INFESTATIONS, LESS THAN 0.1 ACRE

 = 0.1 to 1 acre

 = 1 to 5 acres

 = Area infestations larger than 5 acres should be outlined directly on map

 = Infestations that follow linear features such as roads and streams should be designated by drawing lines on the map

WEEDS ON THE ROAD OR LINEAR FEATURES (Powerlines, fences)
On forest sites, noxious weeds more typically occur along portions of roads and should be with a separate road code to help when deciding management options. Record whether or not weeds are growing in any **road bed or R/W** (includes cut and fill) located in the **stand map unit/polygon** or located adjacent to the polygon. If a road separates two or more stands, record the presence of weeds for the stand that most of the road is adjacent to.

ROAD CODE	DESCRIPTION
R 1	**Spotty**; noxious weeds are growing in the road(s) in a few small spots (less than an area 20' x 20').
R 2	**Established patches**; noxious weeds are growing in patches in the road(s). Some of the weeds are growing in patches greater than an area 20' x 20' in size (400 ft^2).
R 3	**Abundant**; noxious weeds are growing throughout most of the road(s) bed and/ or R/W (> 50% of the road area).

In addition to drawing the line on the map, the following information is useful to record.

1. **Width of line**. Record the width of the weed infestation in yards next to the line drawn on the base map.

2. **Direction of weeds from line or road**. Next to the line, write an **L, R**, or **C** depending on where the weeds are located (i.e., are the weed infestations to the left, right, or in the center of the line you have drawn on the base map?)

STEP 3
Record site information and recommended treatments on back of weed form.

SITE #
Note site number referenced on map, this may be a segment of road, stand unit or delineated weed infestation.

WEED SPECIES
Note noxious weed species present on site. Where more than one weed species occurs in a mappable area/site, you may chose to note each weed species as a separate line to denote the ground cover class and recommended treatment. Such as when you have widespread knapweed, with some isolated toadflax plants, you may eradicate the toadflax, but tolerate the knapweed based on the site.

COUNTY PRIORITY
List the county noxious weed priority available from the CINWA agreement signed for the area of operation. The county priority should be considered in treatment objective.

INFESTATION SIZE (CODE) Refer to description at base of weed form. Designate area of weed infestation or length and width of road / linear feature (powerline, fence, etc.) to provide details for areas outlined on reference map.

INDICATE PERCENT COVER BY SPECIES
Weed ground cover has been determined to be the most important standard data to be collected for the statewide system and is essential to determining treatment methods. Estimate ground covered by a particular weed species and categorize by cover classes of Trace, Low, Moderate or High as described below. Cover class should be indicated directly on the map next to the infested acres symbol. Use the following symbols to indicate infestation cover class.

NATIVE VEGETATION
Record dominant vegetation habitat type or general description
This will help to determine long range objectives.

DETERMINE TREATMENT OBJECTIVES

Weed Management Control Objectives (ARM 36.11.445)

ERADICATE	Attempt to eliminate a noxious weed species from site, recognizing that this may not be achieved during the analysis period. However, eradication efforts would continue as long as detectable weeds were present.
SUPPRESS	Prevent seed production through the target patch and reduce the area coverage of the weed. Prevent the weed species from dominating the vegetation of the area, but accept low levels of the weed.
CONTAIN	Prevent the spread of the weed beyond the perimeter of patches or infestation area established at time of survey. Tolerate weeds within established infestations, but Suppress or Eradicate outside those areas.
TOLERATE	Accept the continued presence of established infestations and the probable spread to ecological limits for certain species. Try to exclude new invaders through preventative measures.

TREATMENT RECOMMENDED

Based on weed inventory and management objectives, recommend treatment measures considering integrated weed management tools outlined in Weed RMS # 3A.

IMPLEMENTATION Abbreviated **IMP YES/NO**

Note date treatment measures implemented, or planned date to implement. Leave blank if no treatment applied to allow for future update without additional form.

Montana County Noxious Weed List

* New Additions Effective June 27, 2003

Noxious weed species: Common name/ Scientific name
Species descriptions and photos can be found on internet invaders website http://invader.dbs.umt.edu and www.mtweed.org

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Category 1.

Category 1 noxious weeds are weeds that are currently established and generally widespread in many counties of the state. Management criteria include awareness and education, containment, and suppression of existing infestations and prevention of new infestations. These weeds are capable of rapid spread and render land unfit or greatly limit beneficial uses.

a. Canada Thistle (*Cirsium arvense*)
b. Field Bindweed (*Convolvulus arvensis*)
c. Whitetop or Hoary Cress (*Cardaria draba*)
d. Leafy Spurge (*Euphorbia esula*)
e. Russian Knapweed (*Centaurea repens*)
f. Spotted Knapweed (*Centaurea maculosa*)
g. Diffuse Knapweed (*Centaurea diffusa*)
h. Dalmation Toadflax (*Linaria dalmatica*)
i. St. Johnswort (*Hypericum perforatum*)
j. Sulfur (Erect) Cinquefoil (*Potentilla recta*)
k. Common Tansy (*Tanacetum vulgare*)
l. Ox-eye Daisy (*Chrysanthemum leucanthemum* L.)
m. Houndstongue (*Cynoglossum officinale* L.)
n. Yellow Toadflax *(Linaria vulgaris)**

Category 2.

Category 2 noxious weeds have recently been introduced into the state or are rapidly spreading from their current infestation sites. These weeds are capable of rapid spread and invasion of lands, rendering lands unfit for beneficial uses. Management criteria include awareness and education, monitoring and containment of known infestations, and eradication where possible.

a. Dyers Woad (*Isatis tinctoria*)
b. Purple Loosestrife or Lythrum (*Lythrum salicaria, L. virgatum*, and any hybrid crosses thereof)
c. Tansy Ragwort (*Senecio jacobea* L.)
d. Meadow Hawkweed Complex (*Hieracium pratense, H. floribundum, H. piloselloides*)
e. Orange Hawkweed (*Hieracium aurantiacum* L.)
f. Tall Buttercup (*Ranunculus acris* L.)
g. Tamarisk [Saltcedar] (*Tamarix* spp.)*
h. Perennial pepperweed *(Lepidium latifolium)**

Category 3.
Category 3 noxious weeds have not been detected in the state or may be found only in small, scattered, localized infestations. Management criteria includes awareness and education, early detection and immediate action to eradicate infestations. These weeds are known pests in nearby states and are capable of rapid spread and render land unfit for beneficial uses.

a. Yellow Starthistle (*Centaurea solstitialis*)
b. Common Crupina (*Crupina vulgaris*)
c. Rush Skeletonweed (*Chondrilla juncea*)
d. Eurasian watermilfoil *(Myriophyllum spicatum)**
e. Yellow flag iris *(Iris pseudacorus)**

Plants listed as noxious by one or more Montana counties (partial list)
Anthemis cotula (dog fennel)
Artemisia absinthium (absinth wormwood)
Azolla mexicana (mosquito fern)
Butomus umbellatus (flowering rush)
Campanula rapunculoides (creeping bellflower)
Carum carvi (caraway)
Centaurea X pratensis (Meadow knapweed)
Cichorium intybus (chicory)
Cytisus scoparius (Scotch broom)
Dipsacus sylvestris (teasel)
Echium vulgare (blueweed)
Elaeagnus angustifolia (Russian olive)
Gypsophila paniculata (baby's breath)
Hydrilla verticillata (water thyme)
Iris pseudacorus (yellow iris)
Knautia arvensis (bluebuttons)
Linnaria vulgaris (common toadflax, butter and- eggs)
Lycium barbarum (matrimony vine)
Myriophyllum spicatum (Eurasian water milfoil)
Polygonum cuspidatum (Japanese knotweed)
Reseda lutea (yellow mignonette)
Salvia nemorosa (woodland sage)
Silybum marianum (milkthistle)

DNRC Riparian Watch List (Revised 7/04)
Noxious weeds and invasive plants especially adapted to moist riparian sites that are higher risk of establishment.
Lythrum salicaria, L. virgatum (purple loosestrife)
Ranunculus acris (tall buttercup)
Senecio jacobea (tansy ragwort)
Tamarix ramosissima (tamarisk)
Tanacetum vulgare (common tansy)
Iris pseudacorus (yellow iris)
Myriophyllum spicatum (Eurasian water milfoil)
Hydrilla verticillata (water thyme)
Polygonum cuspidatum (Japanese knotweed)

Appendix C

SUPPORTING FORM FOR THE CUMULATIVE WATERSHED EFFECTS CONSERVATION STRATEGY

COARSE FILTER ANALYSIS FORM

DNRC – Forest Management Bureau
Version: 2004.2

Analyst:

Date:

A. PROJECT INFORMATION

Project name:

Extent and intensity of proposed actions:

Area Office / Unit Office:

Legal(s):

B. MAP INFORMATION

GIS project file name and location:

GIS layers used:

USGS quad:

Other mapping resources:

C. GENERAL WATERSHED INFORMATION

6th Code HUC numerical ID:

Major drainage name:

Tributaries:

Basin area:

Precipitation (weighted mean):

Runoff:

Ownership:

Other water resources:

Landtype associations or soil types prone to mass wasting:

Potential risk of surface erosion:

Additional geographic information:

If applicable

7th Code HUC or equivalent ID:

Major drainage name:

Tributaries:

Basin area:

Precipitation (weighted mean):

Runoff:

Ownership:

Other water resources:

Landtype associations or soil types prone to mass wasting:

Potential risk of surface erosion:

Additional geographic information:

D. STATUS OF AFFECTED WATER BODIES

Water-use classification (Water Quality Standards):

Downstream beneficial uses:

Water rights:

1996 303(d) listing name (if applicable):

1996 303(d) listing cause(s):

1996 303(d) listing sources(s):

200 303(d) listing name (if applicable):

200 303(d) listing cause(s):

200 303(d) listing sources(s):

TMDL status:

E. FISHERIES PRESENCE INFORMATION

Internal fisheries habitat survey data: ☐ Yes ☐ No

☐ Internal fisheries habitat survey data attached

MFISH data: ☐ Yes ☐ No

☐ MFISH data attached

FWP contact and relevant information:

USFS contact and relevant information:

Other contact and relevant information:

Native species present:

Status of native species present:

Non-native species present:

F. EXISTING WATERSHED CONDITIONS AND OTHER RESOURCE DATA

Sediment (☐ attached):

Stream temperature (☐ attached):

Large woody debris (☐ attached):

Channel morphology (☐ attached):

Stream stability (☐ attached):

Flow regime (☐ attached):

Fisheries connectivity (☐ attached):

Road condition inventory (☐ attached):

Mass wasting (☐ attached):

Other monitoring data (☐ attached):

G. OTHER EXISTING AND PROPOSED WATERSHED ANALYSES

Past/proposed DNRC analyses: ☐ Yes ☐ Attached Date(s): ☐ No

Past/proposed other agency(s) analyses: ☐ Yes ☐ Attached Date(s): ☐ No

Past/proposed other organization(s) analyses: ☐ Yes ☐ Attached Date(s): ☐ No

Comments:

H. EXISTING ACTIVITIES

Aerial photo date:

Criteria used to define 'forested':

Estimate of percent of existing harvest within watershed:

Estimate of percent of 'forested' area within watershed:

Estimate of percent of road densities within watershed:

Estimate of percent of road crossing densities within watershed:

Grazing License(s): ☐ Yes ☐ No

☐ Mid-Term and/or Renewal Grazing Assessments attached

I. COARSE FILTER ANALYSIS

Describe the variables considered to determine the potential risk of cumulative watershed effects within the project area:

Clearly describe the collective set of existing conditions that determine the baseline for assessing the risk of adverse cumulative watershed effects:

Clearly describe the rationale used to determine level of risk of cumulative watershed effects as a result of the proposed action(s):

If there is anything other than a 'low' risk of cumulative watershed effects as a result of the proposed action(s), clearly describe the method(s) and scope of additional analysis that is needed: